June 2011/17

Good practice

Annual report

This report is for information

This publication reports on the progress and findings of Estate Management Statistics (EMS) during 2009-10 for the 2008-09 financial year. EMS shares estates information among UK higher education institutions and empowers institutions to improve management of the physical infrastructure. The report highlights five different aspects of estates performance.

Performance in higher education estates

EMS annual report 2010

Scottish Funding Council
Promoting further and higher education

Cyngor Cyllido Addysg Uwch Cymru
Higher Education Funding Council for Wales
hefcw

Department for Employment and Learning
www.delni.gov.uk

HIGHER EDUCATION FUNDING COUNCIL FOR ENGLAND
hefce

Contents **Page**

Performance in higher education estates: EMS annual report 2010

To	Heads of HEFCE-funded higher education institutions Heads of SFC-funded higher education institutions Heads of HEFCW-funded higher education institutions Heads of universities in Northern Ireland
Of interest to those responsible for	Strategic planning, Finance, Estates
Reference	2011/**17**
Publication date	June 2011
Enquiries to	Andrew Smith at HEFCE, tel 0117 931 7001, e-mail a.smith@hefce.ac.uk Derek Horsburgh at SFC, tel 0131 3136649, e-mail dhorsburgh@sfc.ac.uk Chris Cowburn at HEFCW, tel 02920 682247, e-mail chris.cowburn@hefcw.ac.uk Billy Lyttle at DEL, tel 02890 257408, e-mail billy.lyttle@delni.gov.uk

Executive summary

Purpose

1. This publication reports on the findings of the Estate Management Statistics Service (EMS) during 2009-10 for the 2008-09 financial year.

2. Wherever possible, this report looks at major trends across the sector over the last 10 years (1999-2000 to 2008-09). The measures in this report were chosen to align with HEFCE's Capital Investment Framework, the method HEFCE uses to assess the way universities and colleges approach capital investment.

3. The report also includes case studies from five higher education institutions that have shown the greatest improvement over four key measures:

- building condition % gross internal area (GIA) condition A and B[1] (C13[2] – non-residential)
- functional suitability % GIA grade 1 and 2[3] (C13 – non-residential)

[1] That is to say, the two higher grades of the four used by EMS to classify condition.

[2] These codes, used throughout this report, relate to EMS definitions. For more information see www.hesa.ac.uk/index.php?option=com_content&task=view&id=1871&Itemid=233.

- GIA (C13 – non-residential) per student and staff full-time equivalent (FTE)
- energy consumption per student and staff FTE (non-residential).

4. To add richness and an additional dimension to the analysis we have also included analysis by country over the last five years in Annex A.

Key points

5. This report focuses on the performance in UK higher education estates over the last 10 years. From this analysis it is clear that, overall, the UK's higher education estate is now far better placed to withstand the effects of significant change than it was 10 years ago.

6. Non-residential income per m² GIA has risen at an increasing rate over the last 10 years, while at the same time the proportion of institutions' income spent on estates has fallen from 10.9 per cent to 9.4 per cent. This increases institutions' profitability and is despite above-inflation cost increases in some elements of property cost, such as utilities which has increased by a factor of nearly four.

7. The last 10 years have witnessed unprecedented capital investment in the UK higher education estate and for the last seven years, the average ratio of total maintenance costs plus capital expenditure to Insurance Replacement Value (IRV) has remained above the 4.5 per cent threshold suggested by JM Consulting in their 2006 report on capital funding[4]. This has resulted in major improvements to the quality of the estate, such as:

- the average (median) percentage of space in good condition has increased from 63 per cent to 76 per cent between 1999 and 2009
- the average (median) percentage of space deemed functionally suitable has risen from 66 per cent to 83 per cent between 1999 and 2009
- the average (median) backlog affordability score, which measures the number of times an institution's repair backlog is covered by its total income, has risen from 6.6 to 9.0 between 1999 and 2009.

8. Overall, space is being more efficiently used than it was 10 years ago, as evidenced by the highest-level indicator of space (GIA) per student and staff FTE which has gone down from 9.6 m² to 8.8 m² per person.

9. However, this period has also witnessed rapid growth in student numbers and an average (median) 8.3 per cent decline in the number of students would reverse this improvement.

10. In addition, little progress has been made in terms of bringing the amount of academic office space in line with the norms found in other sectors.

---

[3] That is to say, the two higher grades of the four used by EMS to classify functional suitability.

[4] 'Future needs for capital funding in higher education: A review of the future of SRIF and learning and teaching capital'. Report to HEFCE by JM Consulting (September 2006), available at www.hefce.ac.uk/pubs/rdreports/.

11. With the exception of notional CO_2 measures, which have not been included in this report due to an inconsistent time series owing to changes in methodology, environmental performance has seen an improvement over the last 10 years against all key metrics. However, the sector will need to go much further in reducing energy consumption if it is to meet emissions targets for 2020 and 2050.

Action required

12. No immediate action is required of institutions in response to this report. But we recommend that senior management teams and estates committees consider this report in the context of their estates and use EMS to assist them in developing strategies and operational plans.

Introduction

13. The latest Estate Management Statistics (EMS) data set was collated during 2009-10 and covers the 2008-09 financial year. It incorporates data from 160 higher education institutions (HEIs) in the UK and thus continues to deliver a consistent and robust set of estates data for the vast majority of UK HEIs.

14. This 100 per cent participation rate demonstrates the sector's continued commitment to EMS, which remains a voluntary initiative; its continued success reflects the high value placed on it by institutions and others. The increased use of EMS data is demonstrated by the fact that EMS metrics are now embedded in HEFCE's Capital Investment Framework[5] and in People and Planet's 'Green League'[6].

15. This report was produced by IPD Occupiers[7] and has been endorsed by the EMS Steering Group. It looks at the main estates trends and challenges in higher education (HE) and uses IPD's 'balanced scorecard' approach to property performance measurement.

16. This report continues the commentary on sector trends for key metrics consistent with previous EMS annual reports (the most recent being 'Performance in higher education estates: EMS annual report 2009', HEFCE 2010/04[8]), with a particular focus on space use.

17. This year we have again introduced a new feature to the analysis, incorporating percentile ranges, split into four quadrants. Through this we can identify changes in the distribution of the sample over time and address whether metrics are showing signs of converging to a norm or whether there are signs of increasing divergence across the sector.

18. A guide to assist the reader in interpreting the new format of these graphs has been included in the section 'Technical notes and guide for interpretation and replication of results' (paragraphs 99 to 105).

Space and student numbers

19. Before reading the main body of this report it is necessary to consider the effect of the unprecedented growth in UK student numbers over the past 10 years and the corresponding growth in space over the same period.

20. Figure 1 below shows indexed growth in student numbers and space over the past five years in England, Scotland, Wales and Northern Ireland. In all cases except for Northern Ireland, student numbers have risen faster than space, meaning that the overall amount of space per student has fallen.

---

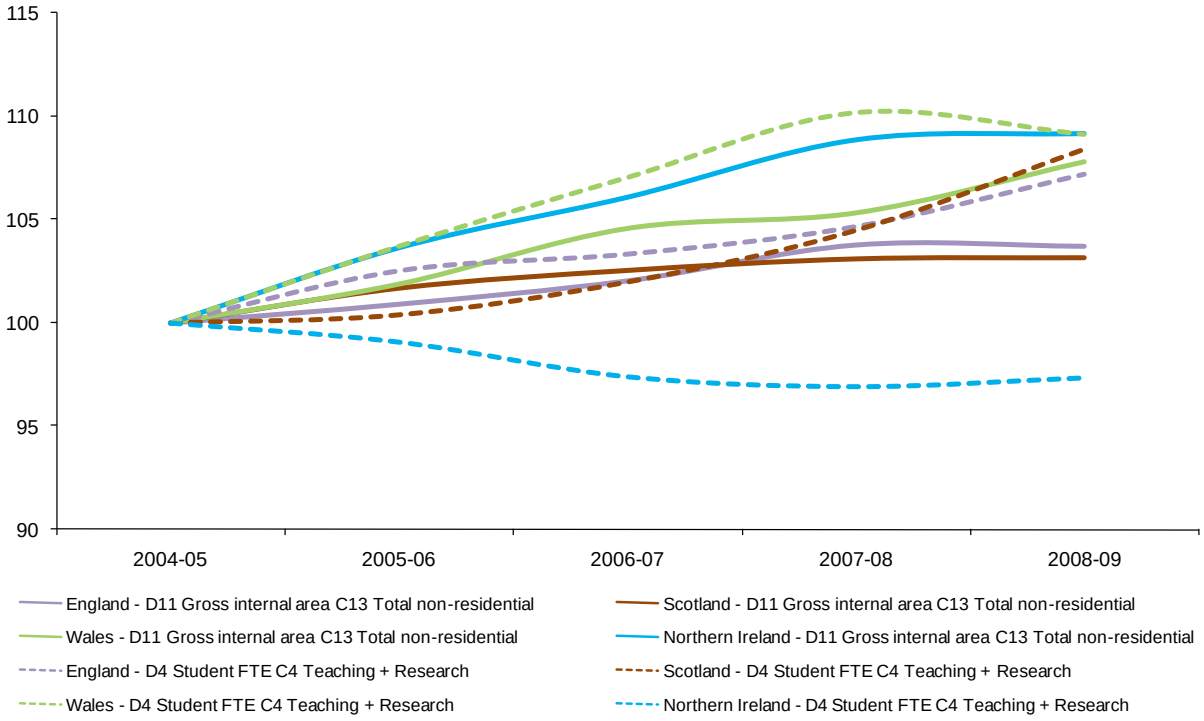
[5] For further details see www.hefce.ac.uk/finance/fundinghe/capital/.

[6] For further details see http://peopleandplanet.org/.

[7] For more information about IPD Occupiers see www.ipdoccupiers.com.

[8] All HEFCE publications are available at www.hefce.ac.uk/pubs.

Figure 1: Indexed growth in student numbers and gross internal area



21. Notwithstanding the effects of increased occupational density (higher electricity consumption, increased asset depreciation rates and so on) the net effect of this change is likely to be increased efficiency in terms of the level of property overhead per person. The other main effect of increased student numbers is higher income and if the rate of increase in income is greater than the increase in expenditure, then many key ratios are likely to improve.

22. These are important factors to consider when reading this report in the context of whether improvements or deteriorations in performance are wholly the result of estates management decisions or due in whole or in part to changes in student numbers.

23. One further factor worth considering in terms of the analysis of the data is their accuracy. While anecdotal evidence suggests that the data have become increasingly accurate over time as institutions have become better at collecting them, all data items within EMS are marked either ‘A’ meaning accurate or ‘E’ meaning estimated. For 1999-2000, 3,939 data items were marked estimated, representing 15.2 per cent of the total: for 2008-09 this had increased to 6,840, representing 14.9 per cent of the total. Although this is not a significant reduction in the overall percentage, the size of the data set and overall number of data items received have more than doubled and have increased relatively consistently over the last 10 years.

24. Each time new data items are added there generally follows a ‘bedding-in’ period while institutions get used to collecting the new data. This makes it likely that core data that have been collected consistently from the start will be more accurate than data added at a later date.

Institutional sustainability

25. The Browne Review of higher education[9] and the subsequent Comprehensive Spending Review were both published in October 2010 and herald significant change and financial pressure. The implications for universities will be clearer following the White Paper in 2011 but, since institutions' expenditure on estates typically accounts for between 9 and 10 per cent of income, it is likely that cuts will impact on estates expenditure.

26. For institutions in England in particular, the coming years will represent a period of uncertainty, rapid change and adjustment as the primary source of funding for most institutions shifts from central Government to students. Some institutions are likely to thrive in this new environment while others may be forced to merge in order to survive. However, this report focuses on the performance of the higher education estate over the last decade and in this respect there are many reasons for the HE estates community to be pleased with the performance.

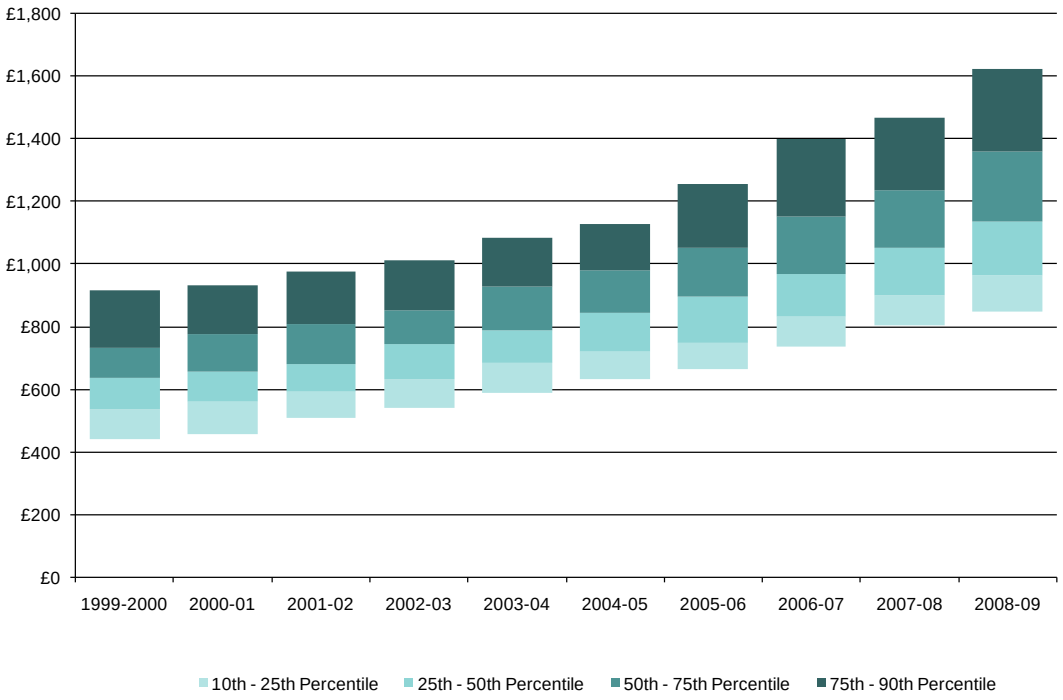
27. Non-residential income per m² of gross internal area (GIA) measures the level of income generated relative to the size of an institution's estate. It is an important high-level measure of institutional sustainability and is included in HEFCE's Capital Investment Framework. The nearest equivalent measure included in EMS is HEI income (D1) per m^2 NIA (D12, C1)[10]: see Annex A, Table 2 for more information.

28. Figure 2 illustrates how non-residential income per m² of GIA has risen consistently year on year over the past 10 years, although the rate of increase has got faster over the past five years. Over this 10-year period, median income per m² rose by more than 78 per cent from £637 per m² to £1,136 per m². This rate of increase is well above the rate of inflation for the same period, as measured by the Retail Price Index (RPI), which rose by approximately 31 per cent over the same period. This measure should be looked at in conjunction with the measure of GIA (C13) per student and staff full-time equivalent (FTE) where the median space per student has been reduced from 9.6 m² to 8.8 m² per person over the same period (see 'Space efficiency' section of this report, paragraphs 51 to 63).

[9] The Independent Review of Higher Education Funding and Student Finance, led by Lord Browne, was tasked with making recommendations to Government on the future of fees policy and financial support for undergraduate and postgraduate students. Its final report, 'Securing a sustainable future for higher education in England' (October 2010), is available at http://hereview.independent.gov.uk/hereview/report/.

[10] These codes, used throughout this report, relate to the EMS definitions. For more information see www.hesa.ac.uk/index.php?option=com_content&task=view&id=1871&Itemid=233.

Figure 2: Total non-residential income (C13) per m² GIA (D11)



29. At an institutional level the main drivers for income are: geographical location, particularly London and the South East where income needs to be higher to cover the higher costs of living; subject mix; research intensity; and the ability to attract overseas students who are charged higher tuition fees.

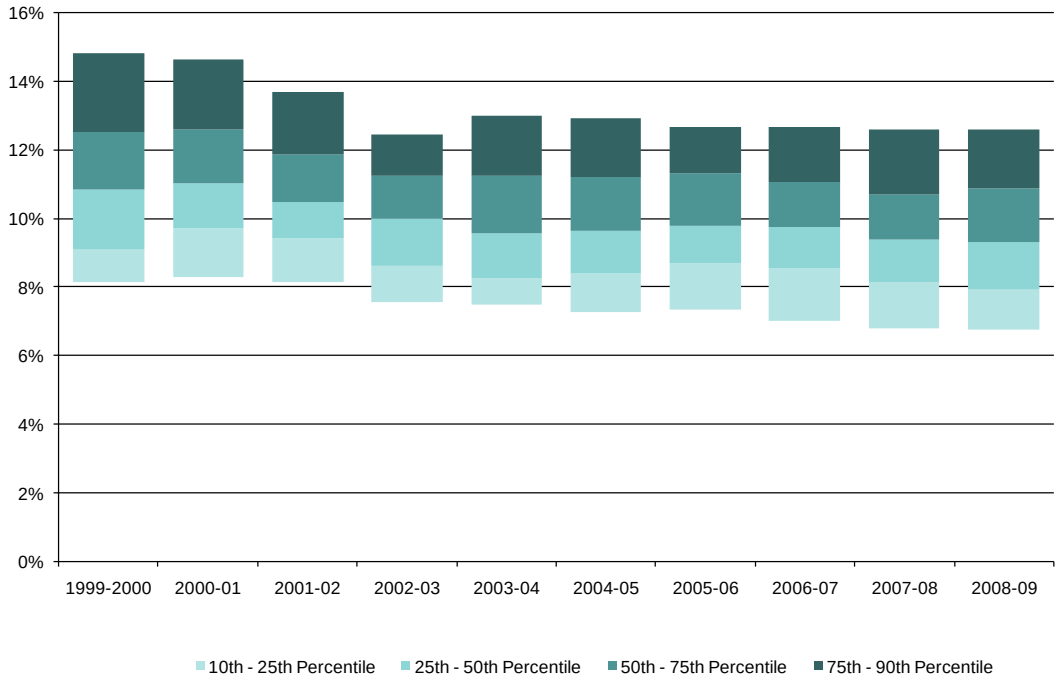
30. Although not all income spend on students can be linked to EMS (for example, changes in standards and requirements relating to IT hardware and infrastructure are not related to EMS), the main outcome of these changes is that most institutions have had an increasing amount of income available to them to potentially invest in the quality of their estates over the past 10 years.

31. However, Figure 2 shows that the variability of results has also increased over the period, meaning that the gap has widened in terms of income between the highest income per m² and those with the lowest. These gaps are likely to increase when the cap on tuition fees is increased.

32. Annex A, Table 2 shows the change in institutional income per m² of net internal area (NIA) between the UK, England, Scotland and Wales over the last five years. Income per m² has increased significantly across the board over the last five years, but remains highest in England at £1,243 per m² as compared to £1,100 per m^2 in Wales and £1,008 per m^2 in Scotland. The average for the UK in 2008-09 was £1,195 per m^2.

33. Conversely, the ratio of total property costs to institutional income has steadily decreased over the last 10 years, as shown in Figure 3, meaning that the proportion of their income that HEIs spend on the estate has not kept pace with increases in income. At 9.3 per cent the median ratio of total property cost to income in 2008-09 is the lowest it has been in the previous 10 years and has gone down by 14.7 per cent from a median of 10.9 per cent in 1999-2000.

Figure 3: Total ratio of total property costs (D26) to HEI income (D1) C1

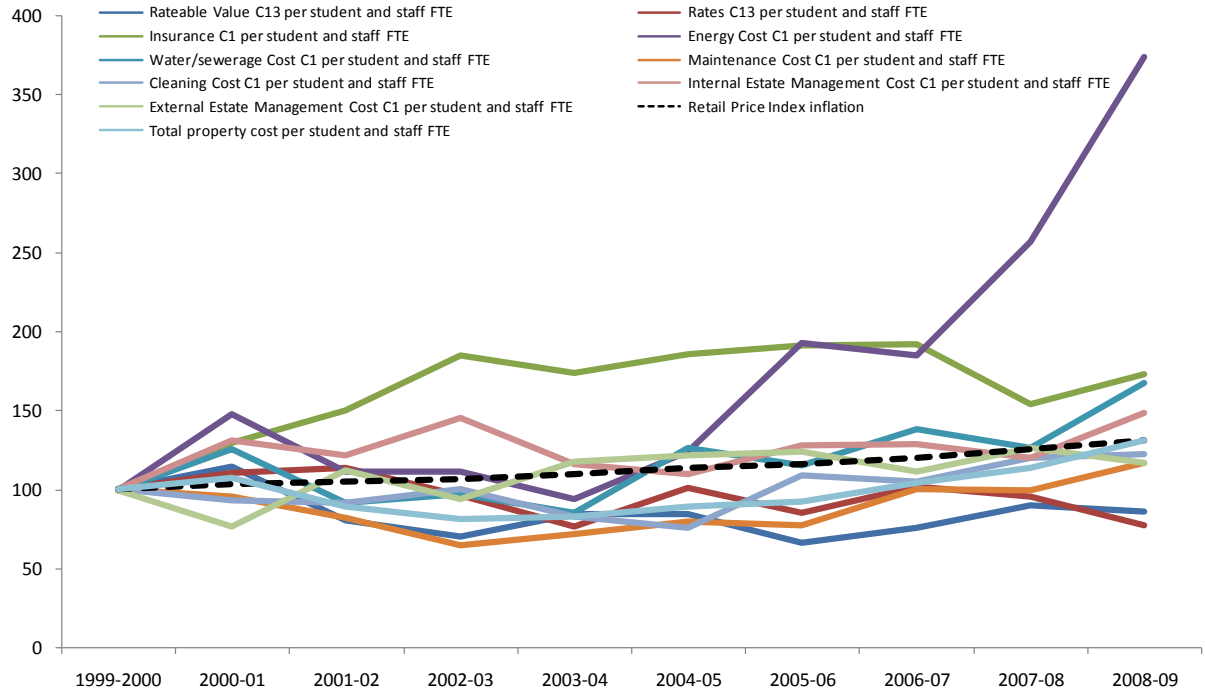


34. Annex A, Table 2 shows the change in the ratio of total property costs to income in the UK, England, Scotland and Wales over the last five years. In Scotland an average of 10.6 per cent of institutional income was spent on estates in 2008-09. This compares to a UK average of 9.4 per cent and 9.2 per cent and 10.1 per cent for England and Wales respectively. However, as income per m² is lower in Scotland and Wales than it is in England, to some extent these differences are to be expected. While the proportion of income spent on estates has gone down in England and Scotland by 1.9 per cent and 3.3 per cent respectively, in Wales it has risen by 13.5 per cent from 8.9 per cent to 10.1 per cent over the same period. Although there are a smaller number of institutions in Wales than in England or Scotland, the sample size in Wales has not changed over this period, although there have been some significant structural changes that are likely to have affected these figures.

35. Figure 4 shows the increase in total property costs per student and staff FTE between 1999-2000 and 2008-09, breaking it down into component elements and comparing these with the rate of RPI inflation over the same period. Service charges have been excluded from this chart due to large fluctuations in their distribution.

36. Between 1999 and 2009 total property cost per student and staff FTE rose by 31.4 per cent while RPI inflation rose by 31.2 per cent over the same period. Although total property cost per student and staff FTE has steadily increased over the last 10 years, it did lag behind the increase in RPI inflation for a number of years. While we do not have reliable space data for the entire sector going back as far as 10 years, Annex A, Table 6 shows that the total amount of space (gross internal area) has increased by only around 4 per cent over the last six years.

Figure 4: Total property costs per student and staff FTE



37. Most of the components of total property cost have increased over the past 10 years, but energy costs per FTE in particular have risen by a huge 374 per cent over the last 10 years. Insurance costs also rose sharply by 73 per cent, and water and sewage costs by 67 per cent, over this period. Conversely, maintenance costs per FTE increased at below the rate of inflation.

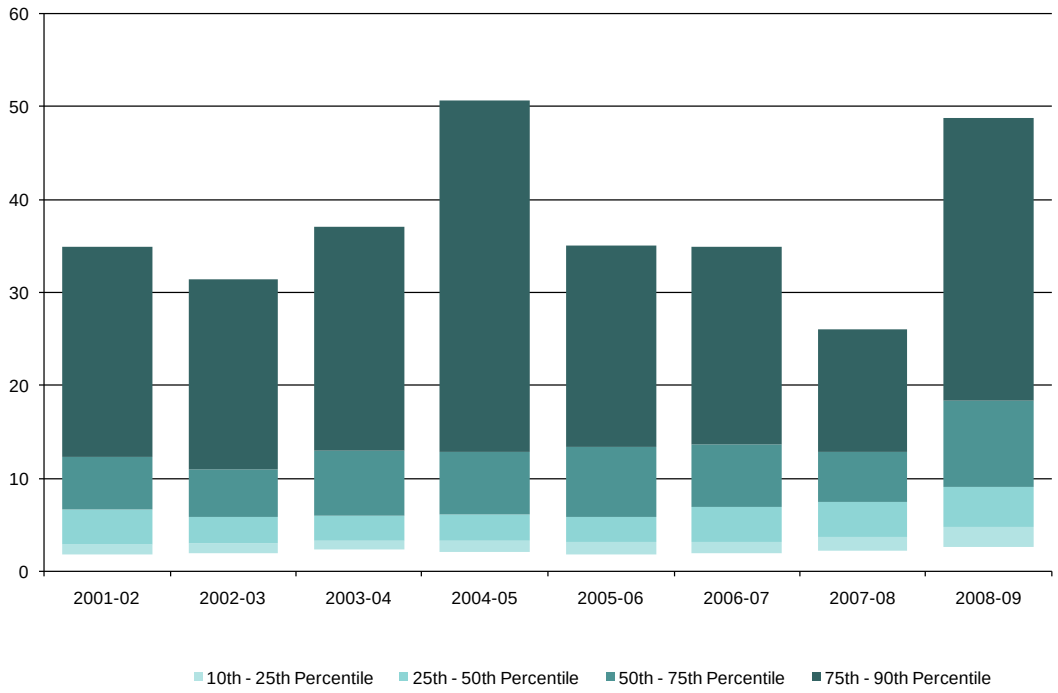
38. Annex A, Table 2 shows the change in total property cost per student FTE in the UK, England, Scotland and Wales over the last five years. On a student FTE basis, the median total property cost for Scottish institutions for 2008-09 (£1,506 per FTE) is well above the equivalents for England (£1,134 per FTE) and Wales (£1,261 per FTE). This is mainly the result of higher space provision in Scotland.

39. Backlog affordability (an expression of the number of times an institution's repair backlog is covered by its total income) demonstrates an institution's ability to meet its repair backlog requirements. A high score is preferable since it means that the institution should be readily able to meet its backlog requirements: a low score, conversely, implies an exposure to risk.

40. Figure 5 shows the backlog affordability scores for all institutions between 2001-02 and 2008-09. Although the results have been quite variable over this period, the median backlog affordability score has improved from 6.6 to 9.0. This means that most UK institutions are in a far better position now regarding their backlog maintenance requirements than they were eight years ago. This improvement is also reflected in the inter-quartile range (difference between the upper and lower quartiles) where the lower quartile value has risen from 2.8 to 4.7 and the upper quartile value from 12.3 to 18.3. These improvements reflect the overall improvement in condition

of the UK higher education estate over the last 10 years, which is described in greater detail in the 'Condition and functional suitability' section (paragraphs 64 to 70) of this report.

Figure 5: Non-residential backlog affordability score

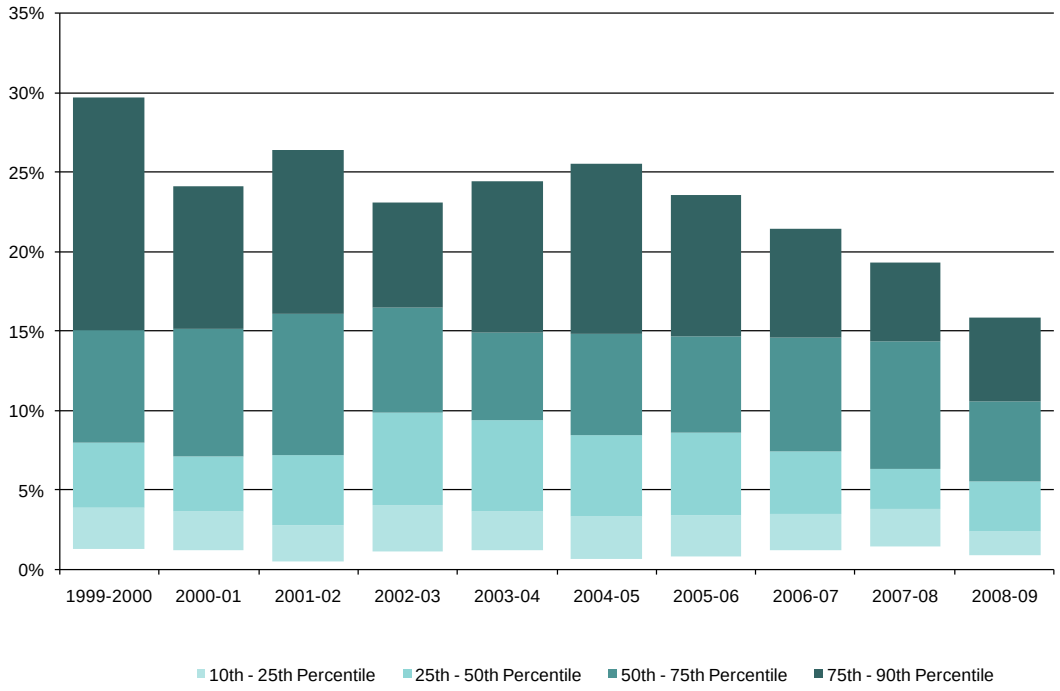


41. Annex A, Table 2 shows the change in non-residential backlog affordability in the UK, England, Scotland and Wales over the last five years. In 2008-09 the median score for English institutions was 9.3. This compares favourably with the medians for Scotland and Wales, which were 5.9 and 6.2 respectively and means that English institutions are better placed to manage maintenance requirements than institutions in Scotland and Wales. Although the backlog affordability score for English and Scottish institutions has improved over the last five years, the average score for Welsh institutions declined.

42. Notwithstanding the decline in Wales, the improving condition and financial sustainability of the UK higher education estate is further demonstrated when looking at the cost to upgrade poor or inoperable space to good condition as a percentage of Insurance Replacement Value (IRV). This has steadily decreased over the last 10 years with the median UK value falling from 7.9 per cent to 5.6 per cent. This measure represents the extent of institutions' repair backlogs relative to their asset bases and shows a steady improvement. Again, this improvement has been driven by the improving condition of the HE estate in the UK over the last 10 years.

43. The variability of results has decreased over the last 10 years, meaning that institutions are dealing with their poor-quality space more consistently.

Figure 6: Cost to upgrade condition C and D[11] to B as % of IRV (C13)



44. Annex A, Table 2 shows the change in non-residential cost to upgrade condition C and D to B as a percentage of IRV in all institutions in the UK, England, Scotland and Wales over the last five years. Improvements have been made across the board. However, despite achieving the biggest improvement over the last five years performance in Scotland at 9.4 per cent of IRV still lags far behind that of England (5.4 per cent) and Wales (5.5 per cent).

45. The ratio of IRV to total income measures the performance of an organisation in terms of the level of return (income) generated relative to the size of its property asset base. A low value reflects good performance in terms of the level of income generated and a high value reflects relatively poor performance. It is assumed when examining this metric that the impact of institutions that either over-insure or under-insure is not significant.

46. Figure 7 shows the change in IRV as a proportion of total income for all institutions between 2001 and 2009. Between 2001 and 2009 the UK median decreased slightly from 2.4 to 2.3. Over the same period the lower quartile also improved slightly from 1.9 to 1.8 and the upper quartile remained unchanged at 2.9. Although these changes represent a slight improvement, they are not significant and mean that most institutions are failing to generate significant additional income from their property assets (in other words, income has broadly remained in the same proportion to the value of property assets). This leads to the conclusion that there remains some potential to 'sweat' higher education property assets more if income becomes harder to come by in future years.

[11] That is to say, the two lower grades of the four used by EMS to classify condition.

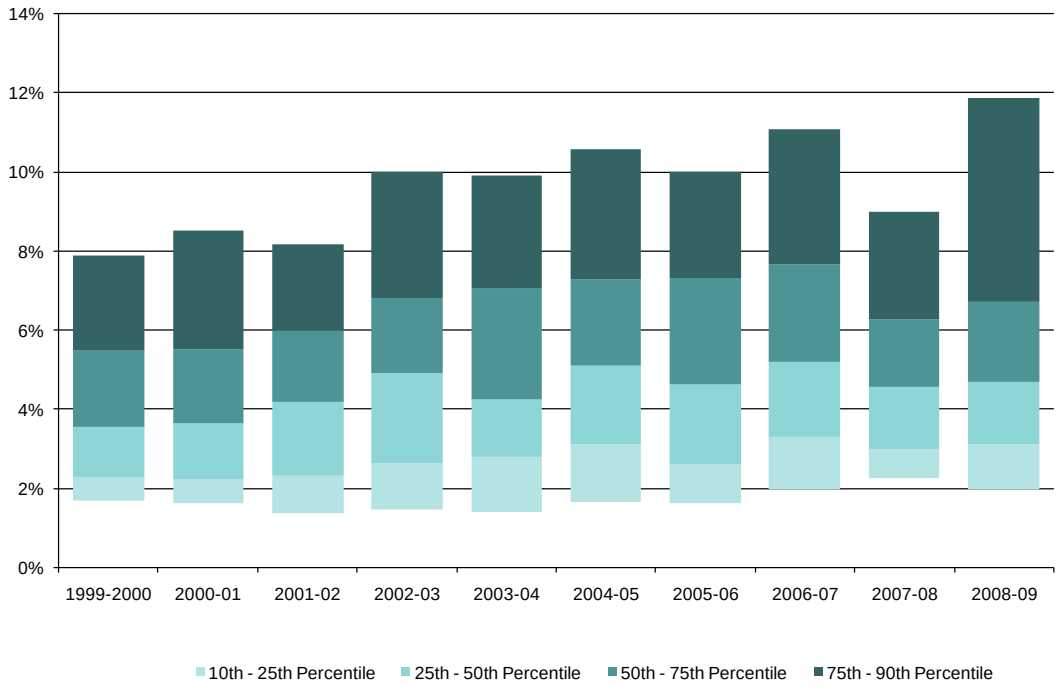
Figure 7: Insurance Replacement Value (D24) to HEI income (D1) C1

47. Annex A, Table 2 shows the change in the ratio of IRV to HEI income for all institutions in the UK, England, Scotland and Wales over the last five years. In 2008-09 the median ratios for England and Wales were 2.3, for Scotland 2.6. This suggests that, relative to their counterparts in England and Wales, institutions in Scotland may struggle to sustain their estates if current funding levels are not maintained in real terms.

48. Figure 8 shows the distribution for all institutions in the ratio between total maintenance costs (planned and reactive), plus capital expenditure to IRV. This is an important measure of financial sustainability and a report written by JM Consulting for HEFCE[12] advised that expenditure should be close to an indicative 4.5 per cent level or that there should be strong justification if not.

[12] 'Future needs for capital funding in higher education: A review of the future of SRIF and learning and teaching capital'. Report to HEFCE by JM Consulting (September 2006), available at www.hefce.ac.uk/pubs/rdreports/.

Figure 8: Ratio of maintenance costs (D33) and Capex (D25) to IRV (D24, C13)



49. While the median has tailed off from a high of 5.5 per cent in 2006-07 to 4.7 per cent in 2008-09, the figure for all UK institutions has remained consistently above the 4.5 per cent threshold over the past seven years; at the same time median condition has also consistently improved, at an increasing rate. This implies a virtuous circle of improving condition and lower maintenance costs with the sector reaping the rewards of consistent infrastructure investment.

50. However, Annex A, Table 2 shows the results for the UK, England, Scotland and Wales over the past five years and reveals that the overall picture masks differences between the three countries that may be of some concern at a national level. For 2008-09 the median ratio of maintenance costs and capital expenditure to IRV in Wales was 3.7 per cent; in Scotland it was 4.0 per cent and in England it was 5.0 per cent. This means that most institutions in Wales and Scotland were not achieving the indicative 4.5 per cent. If this situation continues, the differences in building condition between England, Scotland and Wales referred to elsewhere in this report are likely to be further exacerbated.

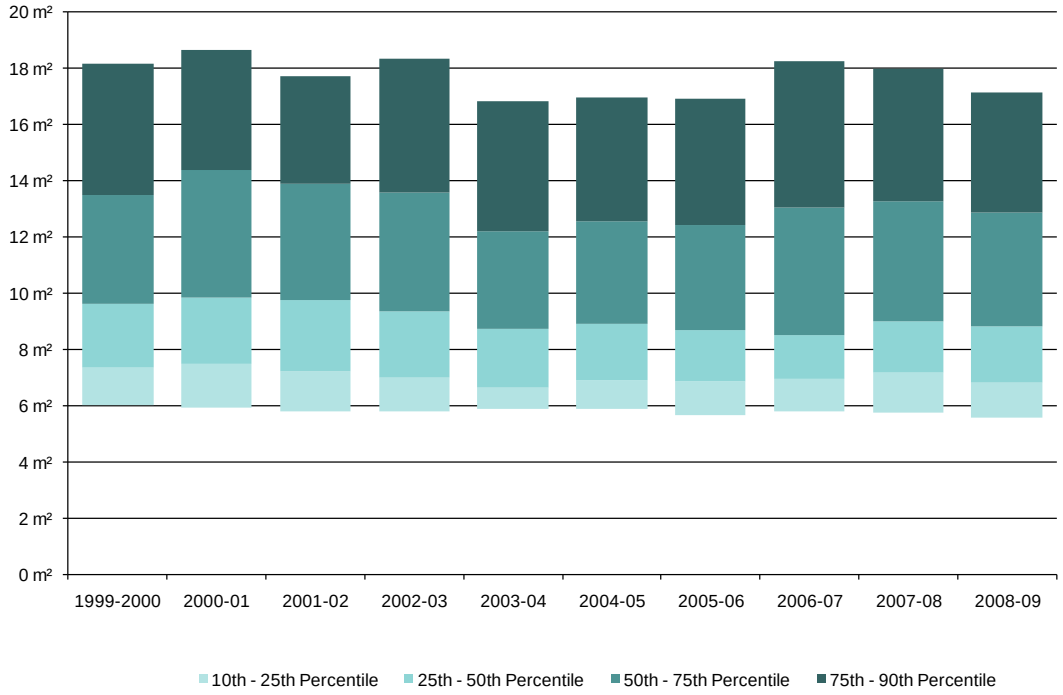
Space efficiency

51. The efficient use of space is critical to reducing costs and improving environmental performance as each square metre of space costs money to operate and maintain, and requires energy to heat, cool and ventilate.

52. Figure 9 shows how the total amount of space has changed for all UK institutions per student and staff FTE between 1999 and 2009. Over this period the median space per person has gone down from 9.6 m² to 8.8 m² and the lower quartile from 7.3 m² to 6.8 m². The upper

quartile has also gone down from 13.6 m² to 12.9 m² and the upper decile from 18.2 m² to 17.2 m². The difference between the upper and lower quartiles in 1999 and 2009 has narrowed from 6.3 m² to 6.1 m², which is encouraging because it means that performance across the sector has become more consistent. These improvements are due to a combination of improved space efficiency and growth in student and staff numbers.

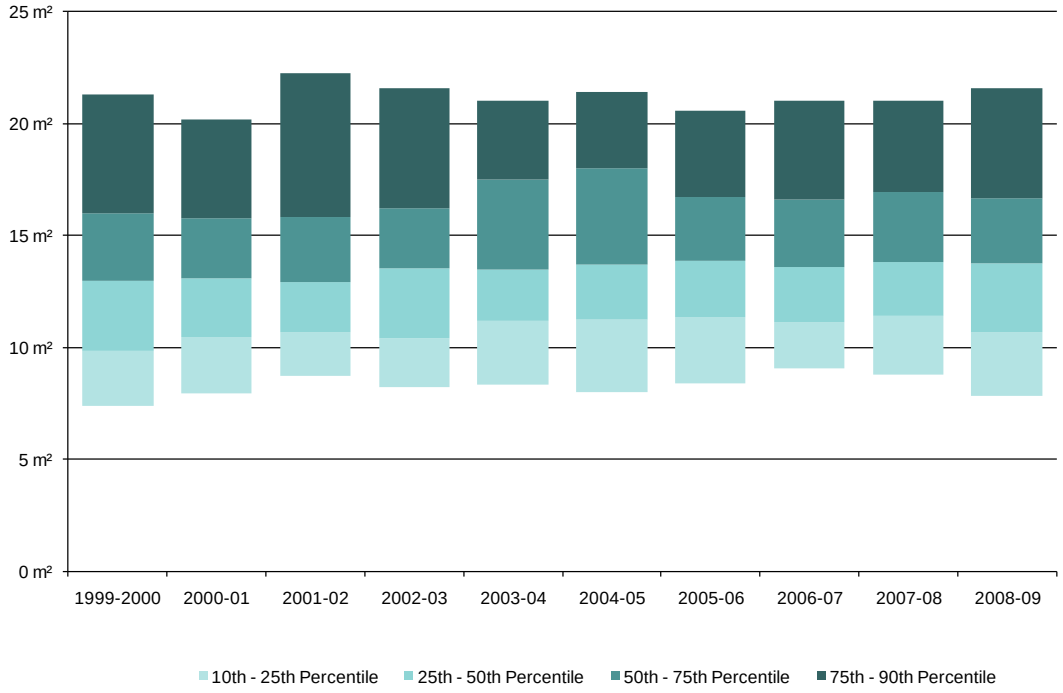
Figure 9: GIA (C13) per student and staff FTE



53. The nearest equivalent standard EMS measure is total non-residential NIA (D12) per student FTE (D4). The results for this measure for England, Scotland and Wales are found in Annex A, Table 3. Despite making the biggest improvement over the last five years, the Scottish HE estate has still to catch up with performance in England and Wales against this measure.

54. Looking more closely at space allocation, Figure 10 shows the distribution across all institutions for academic office space per academic staff member over the last 10 years. The main observation is the lack of progress in terms of space efficiency made against this metric by most institutions. The median office space per academic staff member in 1998-99 was 13.0 m²; in 2009 it was 13.8 m² and it has sat between 13.5 m² and 13.8 m² per staff member for the last five years. The upper and lower quartile values have also risen from 9.9 m² and 15.9 m² to 10.7 m² and 16.7 m² respectively.

Figure 10: Academic office NIA (D12) C2 and C5 per academic staff FTE (D5)



55. Further analysis by country in Annex A, Table 3 reveals significant differences between England, Scotland and Wales, with Welsh institutions providing an average of 15.7 m² per academic staff FTE, Scotland 14.5 m² and England 13.2 m².

56. From our experience in the sector we have established three main constraining factors for institutions in maximising the space efficiency of their academic office space:

- structural constraints
- financial constraints
- cultural constraints.

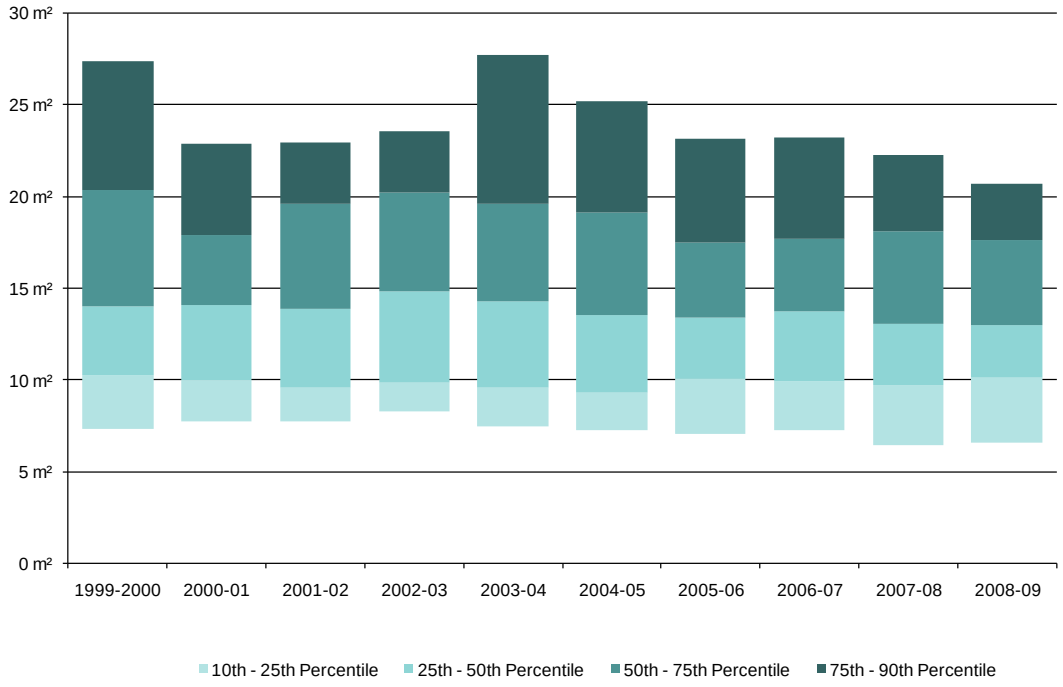
57. Structural constraints refer to the intrinsic structure of buildings, in terms of their design and age profile in particular. Structural constraints can largely be overcome, or bypassed through relocation and refurbishment, which in turn are constrained by finance and budgets. Estates directors and managers have some degree of control over these factors.

58. However, the cultural change required to reduce the amount of academic office space falls largely outside of the domain of estates directors. Anecdotal evidence suggests that academic offices are sometimes used to attract and retain academic staff. For some academics, having their own office is still regarded as the norm for their discipline and method of teaching, and perhaps a status symbol. Other sectors have moved away from this model and embraced a more open-plan scenario, and institutions should review this area to ensure they are maximising the use of office space.

59. One thing that institutions can do to influence cultural change and make departments more accountable for their space is to introduce space charging. Space charging has been identified by the UK HE Space Management Group as a key factor in optimising the use of space.

60. Steady progress has been made in terms of the efficient use of office space for support staff. Figure 11 shows the distribution of results for the sector over the past 10 years during which time the average (median) amount of space has reduced from 14 m² to 13 m² per person. There has also been a marked improvement in the consistency of results over the past 10 years with the difference between the upper quartile and the lower quartile being reduced from 10 m² to 7.5 m².

Figure 11: Support office NIA (D12) per support office staff FTE (D5)



61. Notwithstanding these improvements, office space norms in UK higher education still lag far behind standards set in other sectors. In 2007 IPD Occupiers produced a report for the Office of Government Commerce that provided office space standards for the UK civil estate[13] of 12 m² per person for existing occupied space and 10 m² for new or newly refurbished office space. However, these standards only tell part of the story because they include types of local and central support space, some or all of which we would not typically expect to find in the comparable categories of space in the EMS return where they are accounted for elsewhere because they are generally shared with students. These areas include:

- reception/waiting areas/rooms

[13] For further details see www.ogc.gov.uk/documents/Efficiency_Standards_for_Office_Space.pdf.

- meeting room space
- catering/vending/pantry space
- smoking rooms
- crèches
- fitness areas and gymnasiums
- filing/storage space
- print and copy areas
- libraries and resource areas
- technical space (server rooms, for example).

62. Looking at IPD's 2010 private sector data bank, these areas accounted for around a third of the total space per person for all UK offices. This means that office space norms in the UK higher education sector still remain completely at odds with standards and norms found in other sectors and there remains significant scope for space rationalisation.

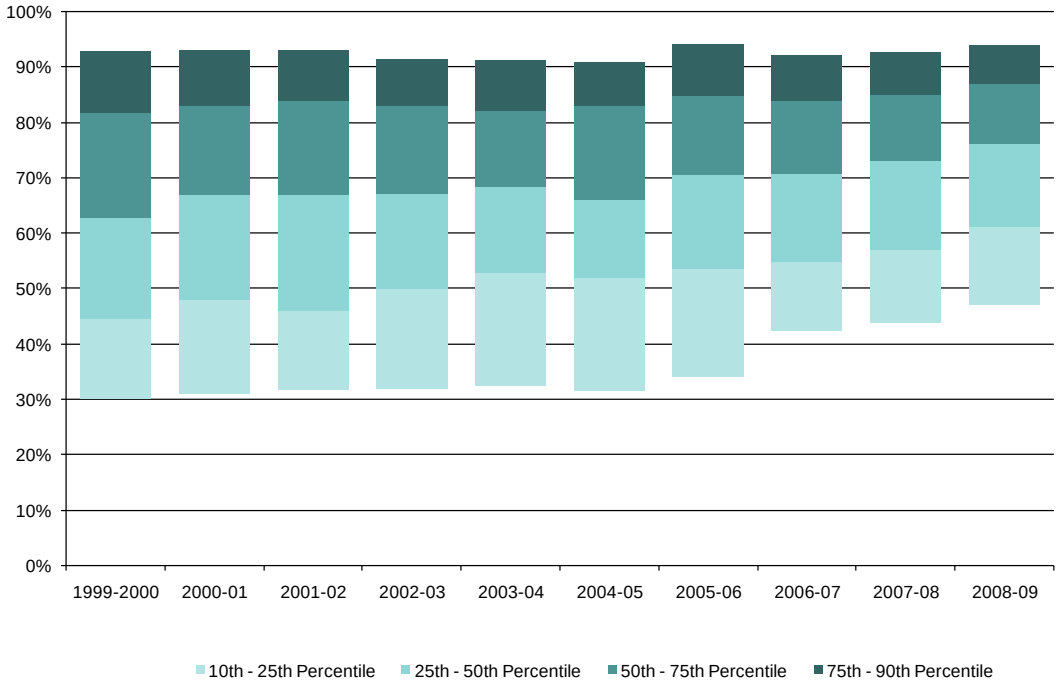
63. Remodelling to achieve improved space efficiency can be costly, but combining this with energy efficiency measures provides the potential for dramatic improvements in condition, energy consumption and operating costs. The EMS case studies in this report highlight the approach taken by a number of institutions.

Condition and functional suitability

64. The quality of the UK higher education estate, in terms of its condition and functional suitability, is very important in meeting the needs of teaching, learning and research. It also has an important bearing on institutions' ability to attract and retain students, particularly from overseas, which may become increasingly important for financial sustainability.

65. Figure 12 below looks at the percentage of space (gross internal area) in 'good' condition for all UK institutions over the past 10 years. It shows that the overall condition of the UK HE estate has improved significantly over the last 10 years, with the median percentage of space in 'good' condition rising from 63 per cent in 1999-2000 to 76 per cent in 2008-09. The lower quartile has also seen a significant rise over the same period, from 45 per cent in 1999-2000 to 61 per cent in 2008-09, indicating a significant reduction of poor condition space across the sector. It is also highly encouraging that the difference between the lower and upper quartile values has narrowed from 37 per cent in 1999-2000 to 26 per cent in 2008-09. This means that the consistency of results has improved markedly.

Figure 12: Building condition % GIA condition A and B (C13)

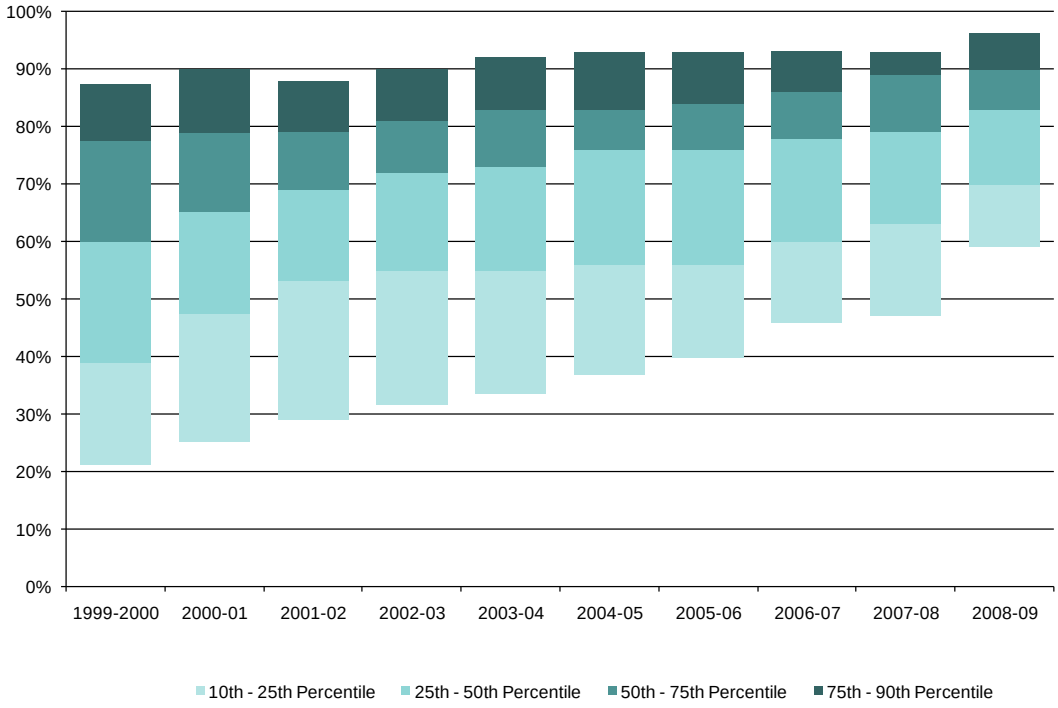


66. In the current economic climate there is no room for complacency and a significant number of institutions still have large amounts of space in poor condition (22 institutions still have more than 50 per cent in poor condition), but the sector has made good strides towards eliminating its poorest-quality space.

67. Annex A, Table 4 shows the figures for the last five years for the UK, England, Scotland and Wales. On a country by country basis there are significant differences, with the 2008-09 median for England being 77 per cent, and 62 per cent for both Scotland and Wales. This means that institutions in Scotland and Wales are not as well placed as their counterparts in England in terms of the condition of their buildings.

68. The overall functional suitability of the HE estate has also improved significantly between 1999 and 2009 with the average institution reporting over 83 per cent of space in functionally suitable condition in 2008-09 compared to just 66 per cent in 1999-2000. Both the upper quartile and lower quartile figures have increased to 10-year highs of 90.5 per cent and 70.5 per cent respectively and this, coupled with the increased consistency of results, indicates significant improvement across the sector in terms of functional suitability. The difference between the lower quartile and the upper quartile over this period has nearly halved from 38 per cent to 19.5 per cent, meaning that the results are far more consistent than they were 10 years ago. This suggests that HE infrastructure is doing an increasingly good job in supporting teaching, learning and research.

Figure 13: Functional suitability % GIA grades 1 and 2 (C13)



69. This is particularly impressive because functional suitability is not fixed; space needs to align with the evolving requirements of students and changing styles of teaching, particularly the transition from traditional 'chalk and talk' to more flexible and interactive styles of teaching.

70. Looking at the results for the last five years for England, Scotland and Wales we can see that the results are far more consistent than they were for building condition with 2008-09 medians of 83 per cent for both England and Scotland and 78 per cent for Wales. This means that although the condition of some of the buildings in Scotland and Wales may be poorer than their equivalents in England, the spaces within them are far more comparable in the extent to which they meet organisational requirements.

Environmental performance

71. Pressure continues to grow on higher education institutions to improve environmental performance. To name just two, the initial set of Carbon Reduction Commitment (CRC) Energy Efficiency Scheme is due to be published in 2011[14] and the Climate Change Act 2008 introduced the world's first long-term, legally binding framework to tackle climate change.

72. Although the amount of CO_2 emitted by institutions is clearly critical in terms of the sector's environmental impact, this report focuses instead on energy consumption. The reason for this is that the EMS figures for notional CO_2 emissions do not provide an accurate time series due to

[14] See www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/crc/crc.aspx.

methodological changes in how they are calculated[15]. The figures for notional CO_2 emissions per student FTE are included in Annex A, Table 5, but should be viewed with some caution for this reason, although they do show significant variance between England, Scotland and Wales, regardless of these methodological changes. In addition, the current methodology uses net calorific values to calculate the emissions for some fuel types, in contrast to the CRC which uses gross values.

73. Institutions wishing to reduce their carbon footprint have two avenues to explore:

- reducing energy consumption
- self-generation.

74. Reducing energy consumption can be split into two streams: smart design and fit (naturally ventilated buildings, installing energy saving features and space management, for example); and influencing human behaviour (encouraging people to switch off appliances, turn off taps, place waste in the correct recycling bins and so on).

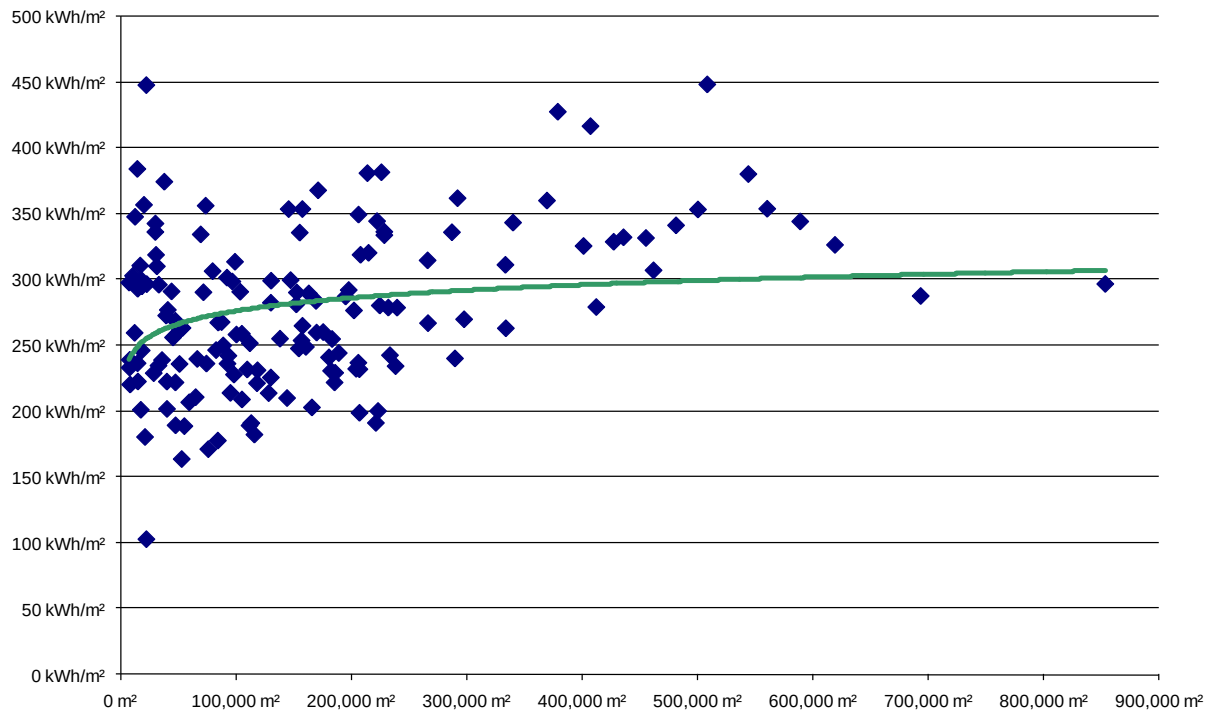
75. Self-generation can be through: combined heat and power; photovoltaics; or wind turbines. A significant initial capital investment is usually required although the return on investment period is coming down very quickly as energy prices continue to rise. In addition, the treatment of Renewable Obligation Certificates and Feed-in-Tariffs will affect whether an institution can claim the carbon savings.

76. Clearly these approaches are not mutually exclusive and a bespoke blended approach by each institution is most appropriate.

77. There may be some advantage, economy of scale or perhaps an optimum size relating to energy consumption. Figure 14 plots energy consumption per m² GIA on the vertical axis against the total size of institutions' estates (GIA) on the horizontal axis.

[15] EMS uses carbon conversion factors from the Department for Environment, Food and Rural Affairs which are updated regularly. Institutions apply conversion factors, so it is not possible to apply changes in conversion factors retrospectively across the time series.

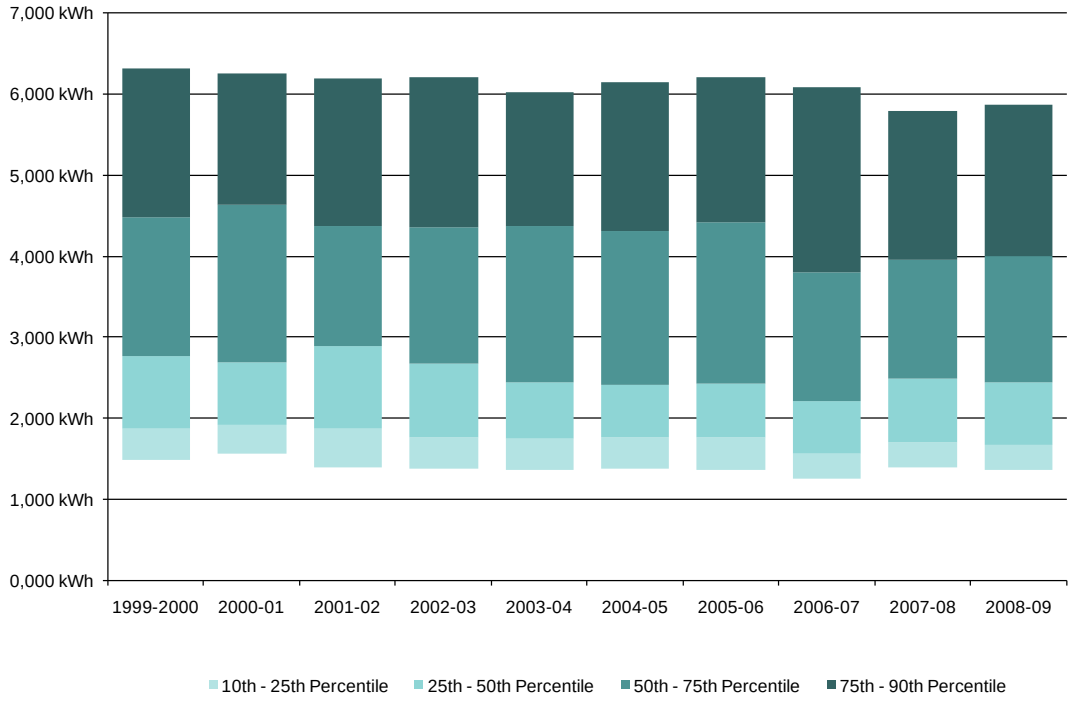
Figure 14: D11 Gross internal area C1 total against energy consumption kWh (D38A) per m^2 GIA (D11) C1



78. The trend line (plotted in green) shows that smaller institutions tend to have lower energy consumption per m^2, although the increase in energy consumption per m² tails off as the size increases. One possible reason for this is that research-intensive institutions tend to be larger than other institutions.

79. The chart below shows non-residential energy consumption per student and staff FTE for all institutions between 1999 and 2009. Over the last 10 years the median energy consumption per student and staff FTE has gone down from 2,764 kWh to 2,446 kWh. This is a significant improvement. Over the same period the difference between the upper and lower quartile values has decreased from 2,609 kWh to 2,337 kWh, meaning that results across the sector have become more consistent. However, these figures have not been normalised to account for weather conditions.

Figure 15: Energy consumption per student and staff FTE (non-residential)

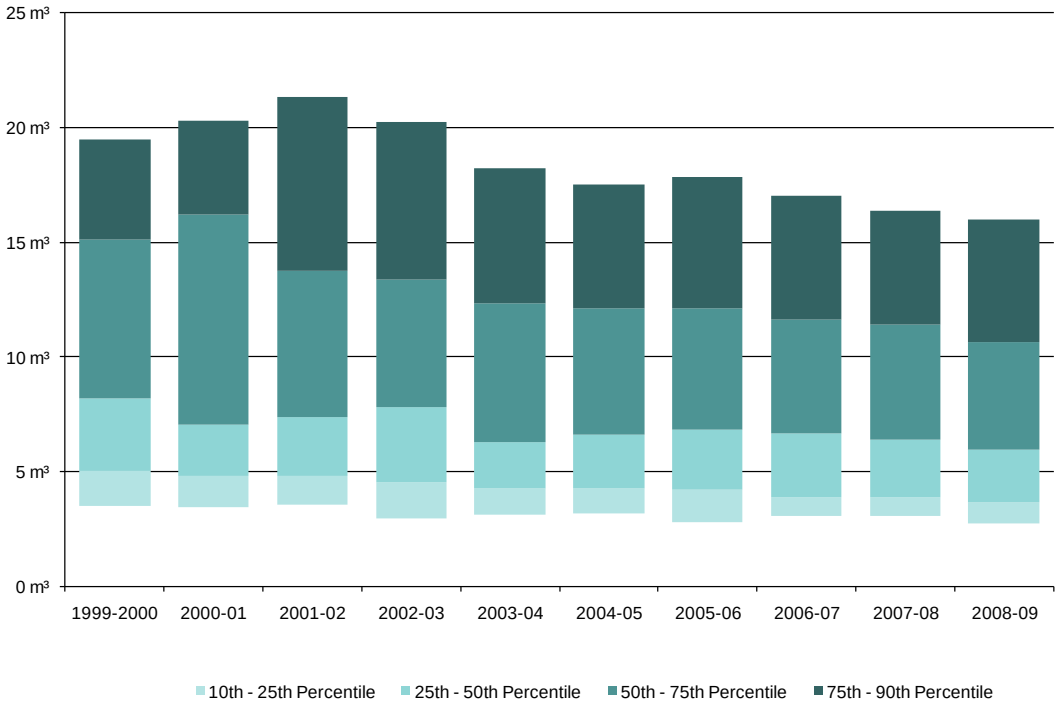


80. Annex A, Table 5 shows the performance across England, Scotland and Wales for the last five years using the nearest equivalent EMS measure, energy consumption kWh (D38A) per student FTE (D4, C13). Annex A, Table 5 shows that while performance in England and Wales is relatively comparable at, respectively, 2,505 kWh and 3,117 kWh per student FTE, performance in Scotland is far higher at 5,440 kWh per student FTE; performance in Scotland has actually risen by more than 5 per cent over the past five years.

81. This can partly be explained by climate – Scotland is further north and therefore requires more heat in the winter – but it is also explained by poorer condition and space efficiency in Scotland, referred to elsewhere in this report.

82. Figure 16 shows non-residential water consumption per student and staff FTE for all institutions between 1999 and 2009. Over this period, median water consumption per student and staff FTE decreased from 8.2 m^3 in 1999-00 to 6.0 m^3 in 2008-09, equating to a decrease of 27 per cent. The variability, in terms of the difference between the upper and lower quartile values, has also decreased from 10.2 m^3 to 7.0 m^3. This is an impressive performance from the sector.

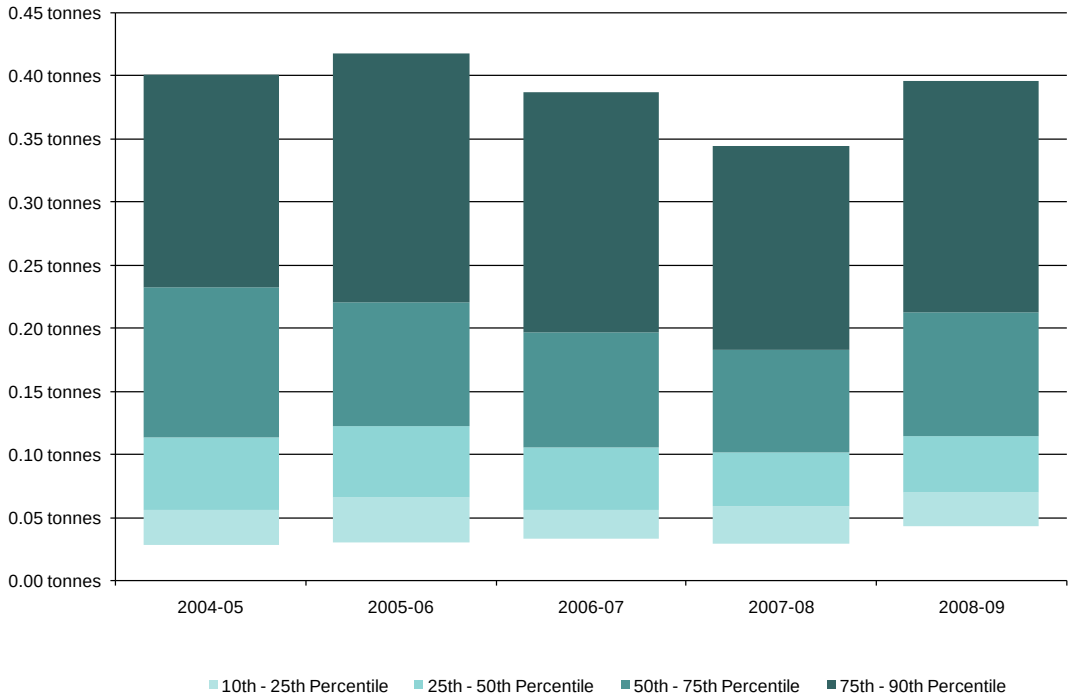
Figure 16: Water consumption (m³) per student and staff FTE (non-residential)



83. Annex A, Table 5 shows the performance for England, Scotland and Wales over the last five years against the nearest equivalent EMS measure, water consumption m³ (D38B) per student FTE (D4, C13). Again, there is a big difference between the performance of Scottish institutions and their counterparts in England and Wales with the average Scottish institution consuming 15.3 m³ of water compared to 6.1 m³ in England and 7.1 m³ in Wales. These differences are more difficult to explain but clearly Scottish institutions are performing relatively poorly against this measure.

84. Minimising and recycling or reusing waste is also becoming increasingly important as available landfill sites become scarcer and the protection of natural habitats and biodiversity become more important. EMS has only been collecting data on institutions' non-residential waste for the last five years and Figure 17 shows the distribution for all UK institutions between 2004 and 2009.

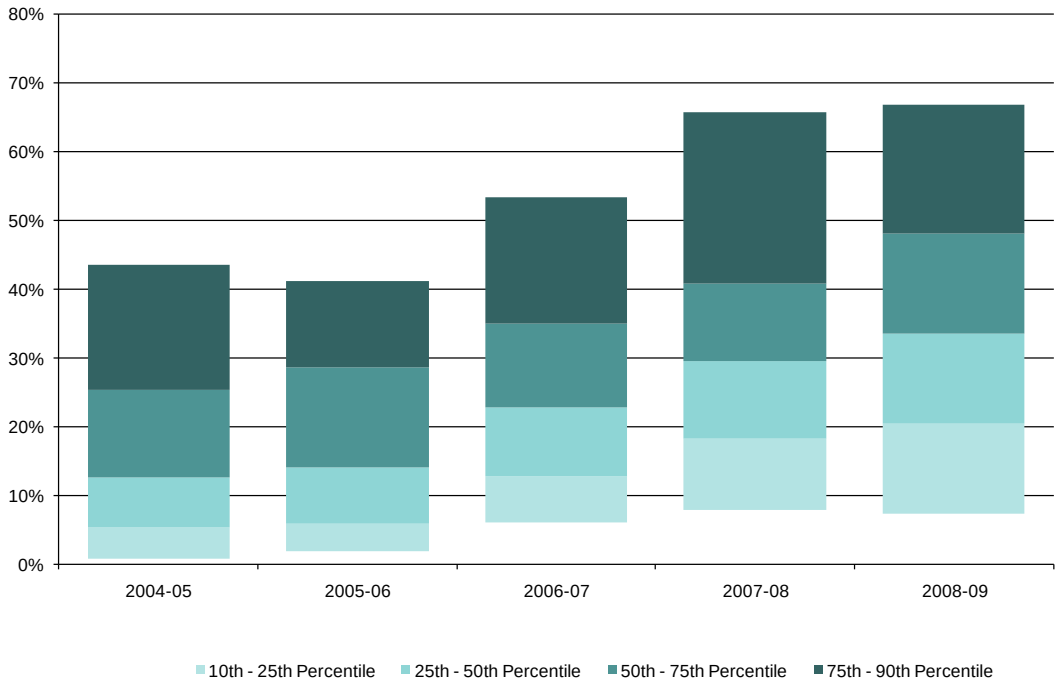
Figure 17: Waste mass tonnes per student and staff FTE (non-residential)



85. Median waste per FTE was constant at 0.11 tonnes per person (staff and students) between 2004 and 2009. As an external comparator, figures from the Department for Environment, Food and Rural Affairs show the average residential household waste per head at 0.47 tonnes per person in 2008-09. The sector is improving its ability to report waste data with the number of institutions providing waste mass data increasing from 85 in 2004-05 to 150 in 2008-09.

86. Figure 18 shows the percentage of non-residential waste recycled for all UK institutions between 2004 and 2009. In terms of recycling rates, the picture is much clearer with the median percentage of non-residential waste recycled rising from 13 per cent in 2004-05 to 33 per cent in 2008-09.

Figure 18: Recycled waste proportion (non-residential)



87. Although Figure 18 relates to non-residential space, the nearest equivalent measure within the EMS reporting tool is recycled waste proportion (C1), which looks at recycling rates for the combined residential and non-residential estates. Annex A, Table 5 shows the median performance of England, Scotland and Wales over the last five years. Although all three countries have made significant progress, median performance in Scotland for 2008-09 (approximately 26 per cent) lags behind performance in England and Wales, both at approximately 35 per cent.

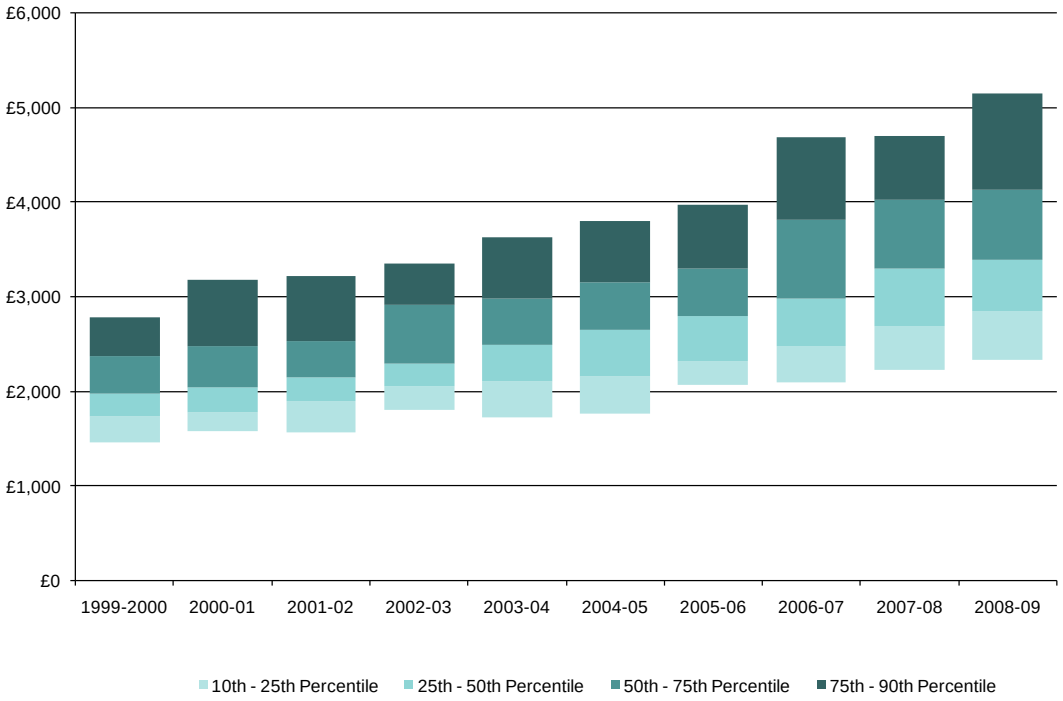
Residential ratios

88. EMS has been collecting the number of 'third-party' residential bed spaces in the UK higher education sector for the past three years. Over this period the total number recorded by EMS has increased from 44,350 in 2006-07 to 66,282 in 2008-09. Third-party provision now accounts for around 21 per cent of total bed space provision across the sector and in some cases accounts for the majority or all of institutions' bed space provision. Notwithstanding these significant changes, residences still account for an important part of most institutions' estates and, whether provided internally or by external providers, are very important in terms of attracting and retaining students. The shift to third-party provision may also have an effect in terms of data quality and consistency – particularly energy and CO_2 figures – where these fall under the contractual remit of third parties.

89. Figure 19 shows income per bed space across all UK institutions between 1999 and 2009. Median income per bed space has risen steadily over the last 10 years from £1,970 per bed space in 1999-2000 to £3,395 per bed space in 2008-09.

90. However, a more significant observation concerns the variability of results, which has changed markedly over the last 10 years. In 1999-2000 the difference between the upper and lower quartile values was £634 whereas in 2008-09 it was £1,263. This means that students are paying a much wider range of prices for their residential accommodation now than they were 10 years ago. This probably reflects greater diversity in standards and could also reflect the fact that some institutions are simply charging more.

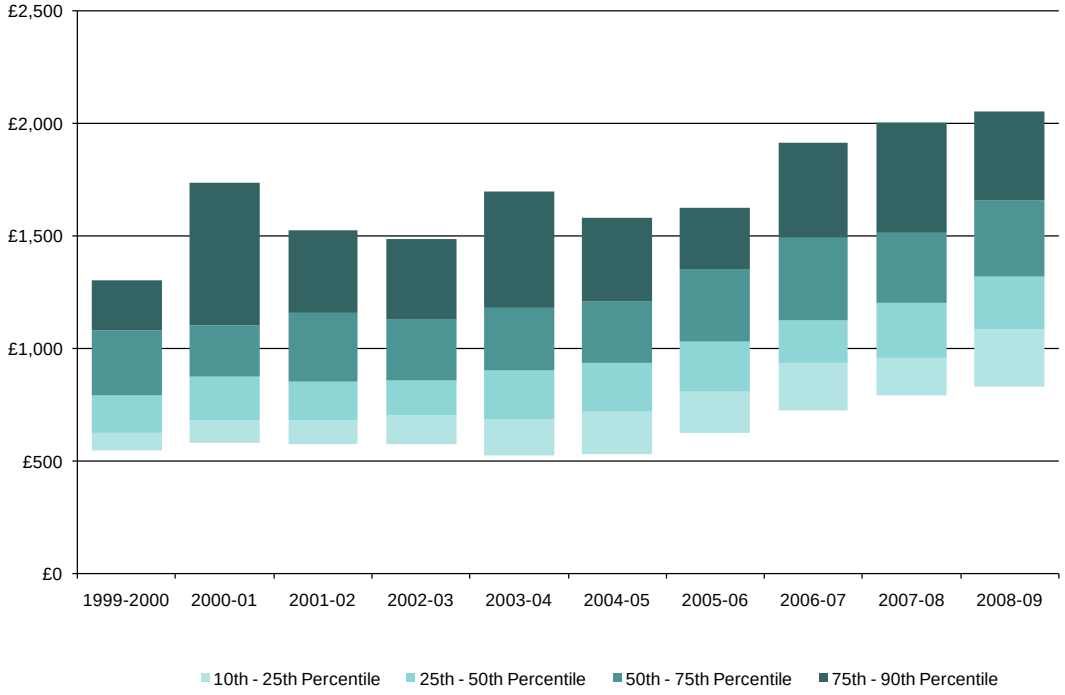
Figure 19: HEI income (D1) per bed space (D23) C14 (residential)



91. Annex A, Table 6 shows the results for England, Scotland and Wales over the last five years and shows that students can expect to pay around 10 per cent less for their accommodation in Wales than in England or Scotland.

92. In terms of cost, Figure 20 shows how total property costs per bed space have changed for all UK institutions over the last 10 years. As with income, total property costs have risen steadily over the last 10 years from a median of £799 in 1999-2000 to £1,322 in 2008-09, an increase of 65 per cent. This compares to an increase of 72 per cent in terms of income per bed space. In terms of variability, it is interesting to note that the difference between the upper and lower quartiles only increased by around 20 per cent over this period, which is far less than the increase in the same range for income per bed space. The implication of this is that while costs per bed space have risen relatively consistently, the amount charged per bed space across the sector has not. This may be because some institutions are seeking to recover the capital costs of investing in their residential buildings through higher charges.

Figure 20: Total property costs (D26) per bed space (D23) C14 (residential)



93. Annex A, Table 6 shows the results for England, Scotland and Wales over the last five years. It is interesting to note that although institutions on average in Scotland incur lower property costs per bed space, this has not led to a proportionate reduction in income per bed space. Taking this one stage further, Table 1 below shows total property costs per bed space as a proportion of income per bed space for the UK, England, Scotland and Wales over the last five years. Void data for residences are not collected under EMS and this would clearly have an effect on income.

Table 1 Income per bed space as a proportion (%) of total property costs per bed space

	2004-05	2005-06	2006-07	2007-08	2008-09
UK	35.3%	36.5%	37.8%	36.3%	38.7%
England	36.6%	37.4%	39.1%	37.5%	38.8%
Scotland	26.6%	26.6%	30.7%	26.2%	31.3%
Wales	33.0%	39.6%	40.6%	40.4%	46.9%

94. Table 1 shows a clear difference between the level of cost recovery between England, Scotland and Wales, with total property costs in Wales on average accounting for nearly half of residential income. Clearly this will adversely affect profitability and financial sustainability for institutions in Wales compared to the rest of the UK.

EMS case studies

95. Case studies looking at four key performance indicators (KPIs) have been selected for inclusion in this year's EMS annual report:

- building condition % GIA condition A and B (C13 – non-residential)
- functional suitability % GIA grade 1 and 2 (C13 – non-residential)
- GIA (C13 – non-residential) per student and staff FTE
- energy consumption per student and staff FTE (non-residential).

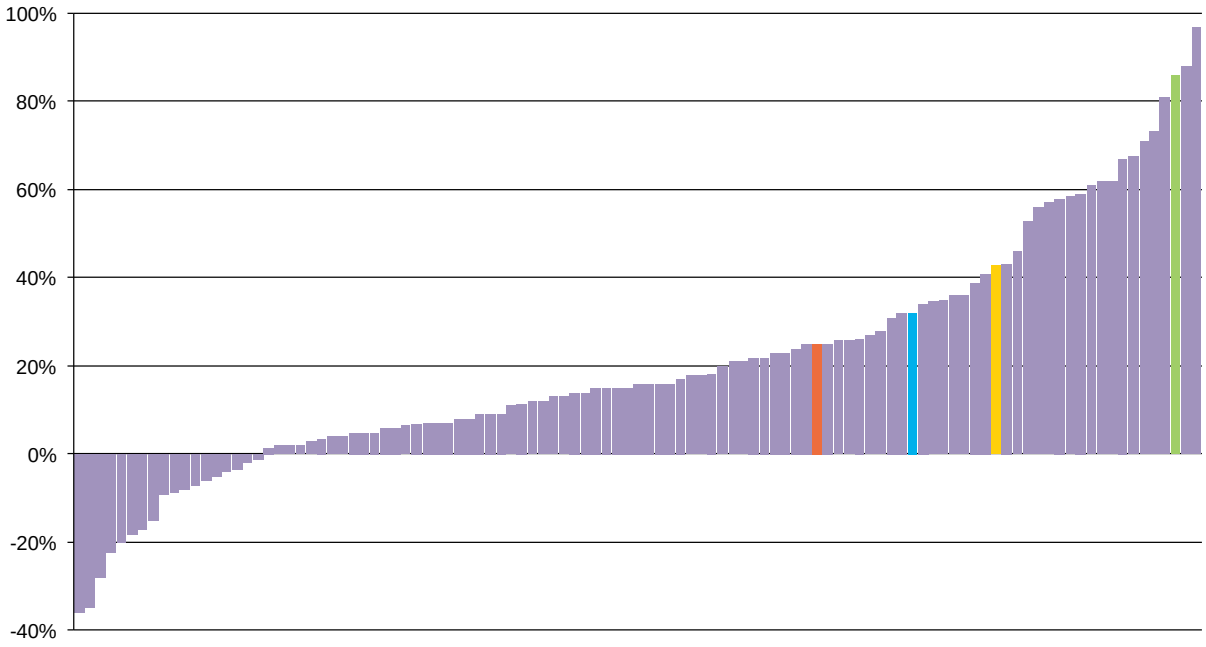
96. In order to align with the main body of this report, the institutions that made the greatest improvement against these measures were approached for case study material on one of the measures listed above. However, in practice the interrelationship between these measures means that improvement in one of these KPIs often influences performance in the others. Therefore Figures 21-25 show how each institution that has contributed a case study has performed against all four performance measures over the last 10 years.

97. Charts for each of these indicators are included on the next two pages and the key below should be used to identify the performance of the five institutions that have provided case studies:

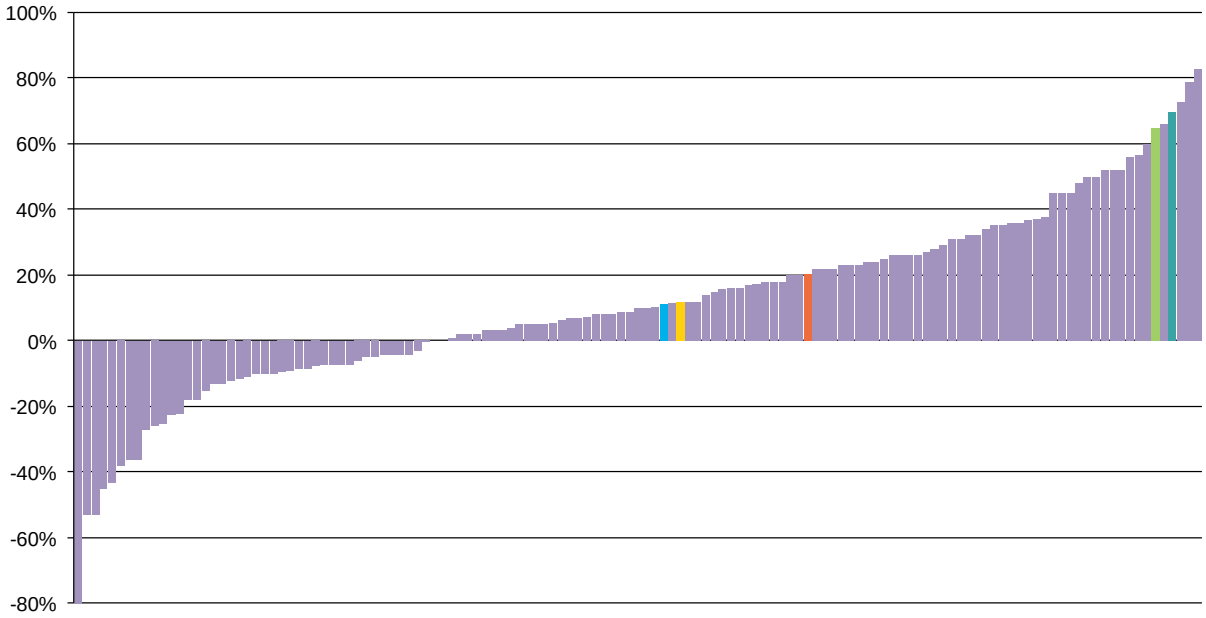
Roehampton University
Newcastle University
Queen Margaret University, Edinburgh
University of Plymouth
Sheffield Hallam University

98. As a general guide for interpretation, performance above the horizontal axis for the first two charts represents an improvement: performance below the axis for the second two charts represents an improvement.

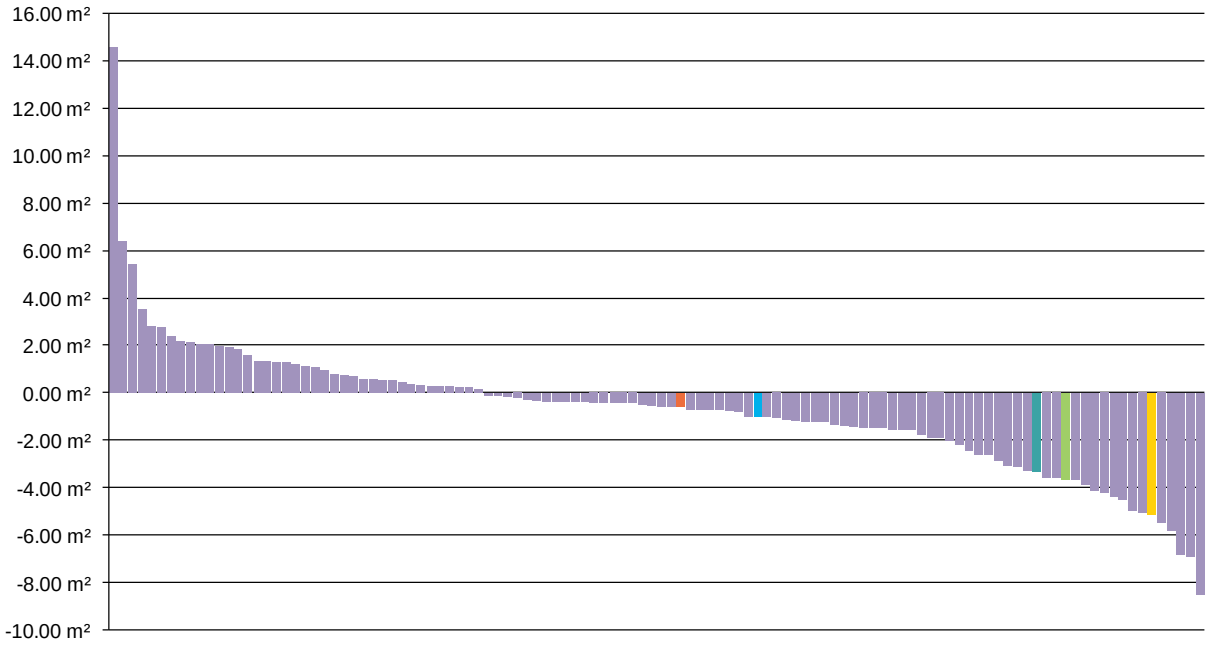
Functional suitability % GIA Grade 1 and 2 C13 - change over 10 years



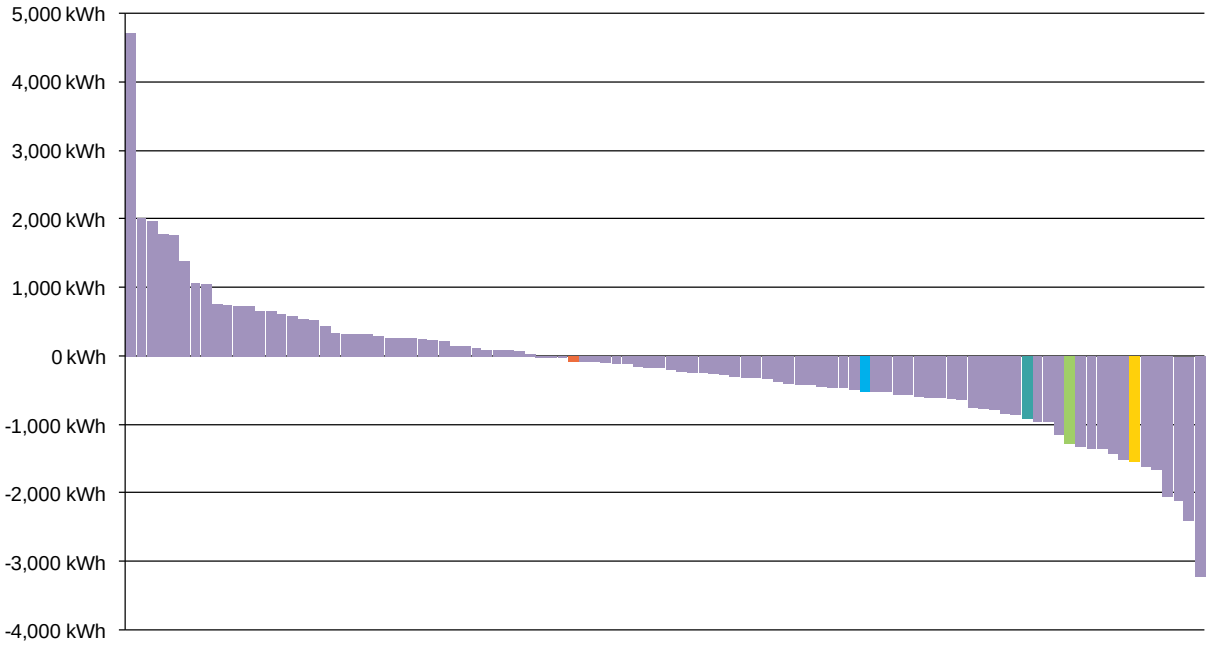
Building condition % GIA Condition A and B C13 - change over 10 years



GIA C13 per student and staff FTE - change over 10 years



Energy consumption per student and staff FTE - change over 10 years



Case study 1: Queen Margaret University, Edinburgh

Between 1999 and 2009 Queen Margaret University reduced its overall non-residential space provision for students and staff by 3.6 m² per FTE; improved the amount of space in functional suitability categories 1 and 2 by 86 per cent; improved the amount of space in condition categories A and B by 65 per cent; and reduced annual energy consumption per person by 1,272 kWh. The case study below explains how this was achieved.

In September 2007, Queen Margaret University's new 35-acre campus at Craighall on the east of Edinburgh was officially opened to its 4,500 students and 500 staff.

The decision to relocate to the new facility was made in 1998, when it was clear that the university's existing estate, located over three separate sites, was unsustainable. A majority of the existing estate was in poor condition with deteriorating buildings that were inflexible and unsuitable for modern learning.

The decision to relocate to an entirely new university campus – the first in Scotland for 40 years – provided a unique opportunity to create a benchmark in 21st-century university design and create an efficient, versatile facility that would be environmentally and financially sustainable.

A truly holistic approach was taken in the briefing and design process for the new campus. Particular emphasis was placed on efficiency and flexibility in use, and in supporting the long-term strategic objectives of the institution while creating a facility capable of being maintained as fit for purpose and in sound repair at minimum running costs.

The development has received awards and widespread recognition providing a foundation for the university to develop in the longer term. Performance of the new estate has improved significantly across a range of measures, notably:

Building condition: An improvement of 65 per cent from previous levels reflects the newness of the estate and a design which has factored in a 70-year life-cycle costing model to ensure that, in terms of planning, this level of building compliance can be maintained.

Functional suitability: This has improved drastically to 86 per cent, again as a result of the purpose-built nature of the facility, combined with its aim to be flexible in use which enables spaces to be reconfigured with reasonable ease.

Space per student and staff FTE: Space efficiency was a major objective in the planning of the new estate. Overall the new campus delivers a reduction in total net internal non-residential area of 30 per cent when compared with the previous estate and student FTE per m^2 levels are 40 per cent better than before. This has been challenging but achieved through a co-ordinated approach involving: elimination of duplicate space; rationalisation of teaching space to better match class sizes; adoption of complete centralised timetabling; and the integration of support and academic staff in multidisciplinary office space.

Sustainability: The campus is recognised as an exemplary green campus and once again this would not have been deliverable without the integrated approach to design and the relationship with space management in terms of overall area reduction and improved efficiency in use. The holistic approach to environmental design incorporates: the UK's largest non-industrial biomass

heat generator; a low-energy ICT strategy; a predominance of natural ventilation; and extensive building management and lighting control systems. Energy consumption is down 35 per cent from the previous estate with carbon emissions reduced by nearly 40 per cent. This combined with the improved space efficiency has resulted in consumption levels at 1,272 kWh per person.

Case study 2: Newcastle University

Between 1999 and 2009 Newcastle University reduced its overall non-residential space provision for students and staff by 5.1 m² per FTE; improved the amount of space in functional suitability categories 1 and 2 by 43 per cent; improved the amount of space in condition categories A and B by 12 per cent; and reduced annual energy consumption per person by 1,530 kWh. The case study below explains how this was achieved.

In 2000 Newcastle University's estate had more space per student and lower functional suitability than most UK universities and was in a relatively poor condition compared to our peer group. Over the last 10 years our strategic direction has been strongly informed by Estate Management Statistics. The outstanding improvement in estate performance has been achieved through consistent effort over time, focusing on space management to optimise the use of buildings and investing in maintenance, refurbishment and replacement as well as demolition/disposal as appropriate. This allowed us to grow student numbers without increasing our carbon footprint.

In 2002 we introduced a space management policy, central timetabling and room auditing to improve teaching space utilisation; developed an intranet-based property register and space allocation procedures to control take-up, release and changes of use; and withdrew from space that was no longer fit for purpose. To ensure estate management is recognised as a key strategic issue, costs are apportioned to academic units as part of assessing their financial performance, which incentivises them to manage their space. This was integrated with our strategy to improve quality and functional suitability, particularly of teaching space, through investment in maintenance, new build and refurbishment. Governance was put in place, with a Space Utilisation and Allocation Committee chaired by the Pro Vice-Chancellor (Planning and Resources).

As a result we currently have a net internal area of 208,275 m^2 against an Estate Strategy target of 217,500 m^2 and Space Management Group prediction of 233,000 m^2; we have increased the amount of floor space in condition A and B to 87 per cent and improved the functional suitability of the estate to 78 per cent in grades 1 and 2 with teaching rooms at 95 per cent. Commercial lettings, excluding ground leases, have increased ahead of Estate Strategy targets with over 15,000 m^2 let to third parties. In the last three years we have released 20,712 m^2 (GIA) for alternative uses, disposal or demolition to offset new-build, and propose to release a further 9,356 m^2 (GIA) by 2012.

Significant progress in reducing energy consumption per capita has been achieved through growth within the footprint, awareness-raising campaigns, addressing waste and focusing on best payback energy saving measures, such as a £4 million boiler replacement programme, improved controls and lighting upgrades, e-billing and better data for energy management. A schedule of energy saving schemes for each building is being assessed for payback.

Planned developments that are essential to our growth and progress will add 22,000 m^2 to our floor area. Renewed focus on space management is required to offset this new build and meet the challenge of carbon reduction. To achieve our new targets will require considerable investment, behavioural change and, as 70 per cent of our emissions are from buildings, a continued reduction of floor space. We are revising our Estate Strategy and developing options to meet these challenges.

Case study 3: Sheffield Hallam University

Between 1999 and 2009 Sheffield Hallam University reduced its overall non-residential space provision for students and staff by 0.6 m² per FTE; improved the amount of space in functional suitability categories 1 and 2 by 25 per cent; improved the amount of space in condition categories A and B by 20 per cent; and reduced annual energy consumption per person by 67 kWh. The case study below explains how this was achieved.

The Facilities Directorate at Sheffield Hallam University has been using the EMS data for many years and continues to look for new ways to utilise the wealth of information they contain.

At a strategic level we use EMS data in our business planning process and as key performance indicators for our department. In recent times the Facilities Directorate has developed a balanced scorecard tool for use at a more operational level and several EMS ratios are used as key indicators to measure our performance.

EMS has been vital to inform reviews of our services, conducted by both internal auditors and external consultants, using the benchmarking data to help us to demonstrate our cost-efficiency. The trended performance data provided by EMS assisted the directorate in achieving the British Quality Foundation's Recognised for Excellence Award in 2007.

In 2006 Sheffield Hallam University commissioned IPD to produce an Estate Performance Review for us, an independent and objective review setting the performance of our institution into context by comparison with relevant peer groups. This has since inspired our own 'annual review of the institution' report, summarising the key EMS results for each operational area of the department which is used by senior managers and the university Executive Group.

Case study 4: University of Plymouth

Between 1999 and 2009 the University of Plymouth reduced its overall non-residential space provision for students and staff by 3.3 m² per FTE; improved the amount of space in condition categories A and B by 70 per cent; and reduced annual energy consumption per person by 921 kWh. The case study below explains how this was achieved.

Over the past 10 years there has been intensive investment in the estate at the University of Plymouth. It arose initially from an academic restructuring exercise that resulted from a detailed estate review carried out in 2001, which considered the implications of co-locating activities carried out on remote satellite sites in Exeter, Exmouth and Seale Hayne near Newton Abbot,

onto the Plymouth campus. This has resulted in a dramatic improvement in the quality of the estate.

At the outset, 70 per cent of the building stock was in building condition categories C and D, where C is defined as ‘operational but in need of major repair or replacement in the short to medium term’ and D is defined as ‘inoperable, or with serious risk of major failure or breakdown’. Furthermore, 70 per cent of the building stock was assessed as unfit for purpose.

With the decision made that relocation to a single campus offered the optimum solution, a capacity study was undertaken and an analysis of development sites on the existing campus was carried out involving envelope studies and an assessment of site-specific criteria and potential capacity.

This resulted in a detailed knowledge base to inform the further stages, including the appointment of external consultants to help create a Strategic Development Plan and a Master Plan for the Plymouth campus: a blueprint for the next 15-20 years.

The development of the plan included consultation with and contributions from appropriate stakeholders including the local planning authority, and considered the environmental, social and economic implications of any future developments for the institution and the wider city. This plan is still a key component of the estates strategy and has formed the basis of campus development since being adopted. It identifies eight key goals as agreed with the local planning authority:

- vibrant area
- breaking barriers
- better public realm
- pedestrians first
- cultural quarter
- quality buildings
- better gateways
- distinctive skyline.

To deliver against the ambitious targets, the university developed a framework incorporating a broad range of consultants and contractors on a 3+1+1-year basis. The relationships that developed within the framework turned out to be instrumental in the successful delivery of the projects.

By September 2009, the estate was reassessed with 82 per cent of the building stock in condition categories A and B, and in functional suitability categories 1 (‘excellent’) and 2 (‘good’). The resultant 70 per cent improvement in the condition of the estate represents a significant achievement and provides an environment conducive to academic excellence.

Following this transformation, estate planning has now reverted to sustaining these improvements, although the Strategic Development Plan is still relevant and provides a framework for current and future developments.

Case study 5: Roehampton University

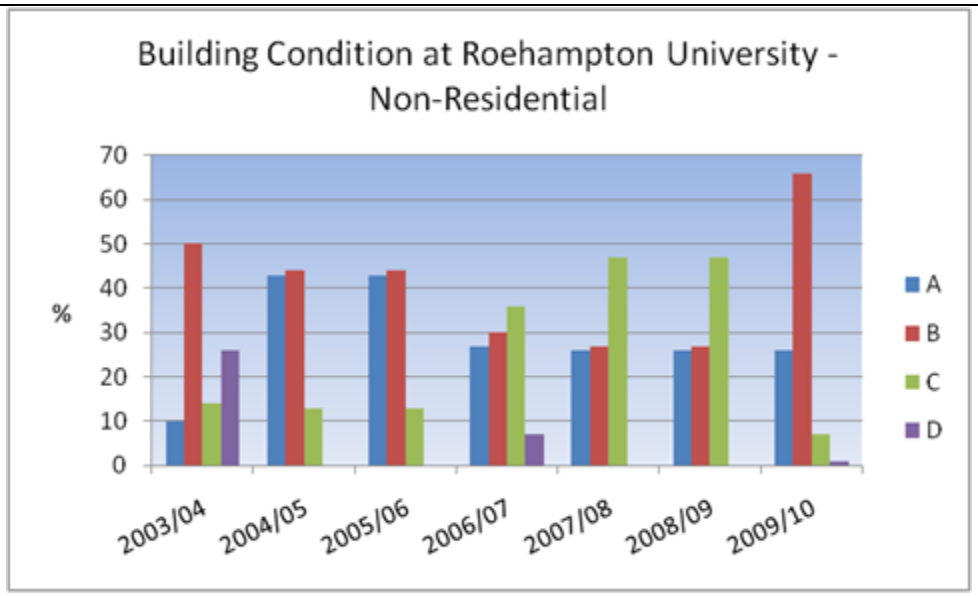
Between 1999 and 2009 Roehampton University reduced its overall non-residential space provision for students and staff by 1.0 m² per FTE; improved the amount of space in functional suitability categories 1 and 2 by 32 per cent; improved the amount of space in condition categories A and B by 11 per cent; and reduced annual energy consumption per person by 506 kWh. The case study below explains how this was achieved.

Roehampton University is located on a beautiful, historical, 54-acre campus in south-west London. It gained university title in August 2004, before which it was part of the University of Surrey Federation and was known as the University of Surrey Roehampton, though its constituent colleges have been in existence from 1841 and came together to form the Roehampton Institute in 1975. The university has a mix of buildings including many modern buildings and five listed buildings, two of which are Grade 1.

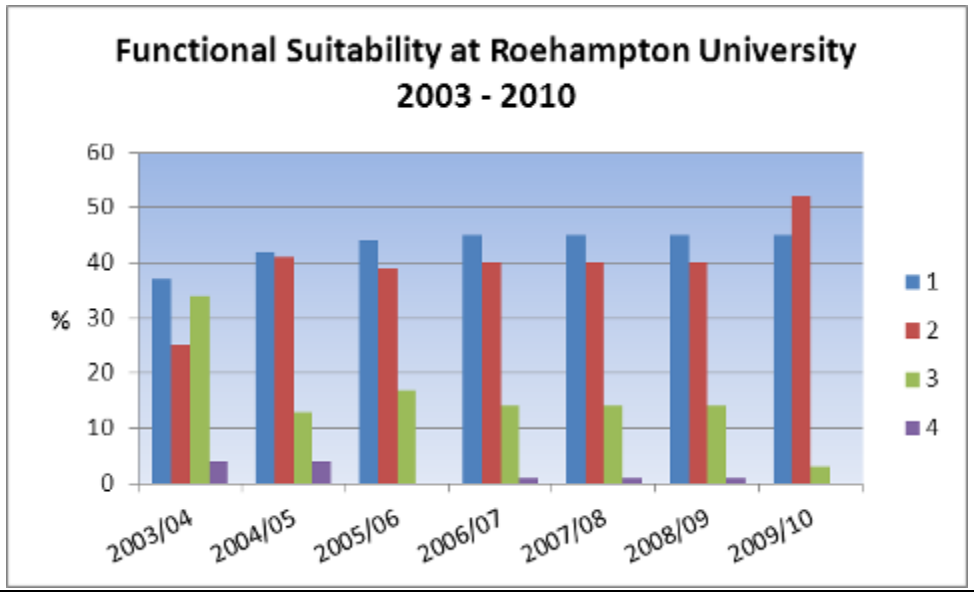
During the last 10 years, the university has seen some significant changes including the building of the new teaching and learning building, a new PE and dance studio, and a new residential block. The most significant development is the move of Whitelands College from its Putney Hill site to the site of Parkstead House, a Grade 1-listed building, with new residences and a teaching and social block.

The university has also put in place extensive programmes to improve the condition and functionality of its buildings. In 2008, the university commissioned detailed condition surveys from Turner & Townsend Chartered Surveyors, which allowed detailed programmes of refurbishment and maintenance to be drafted and implemented over a five-year period. The university has also produced a 25-year campus plan to ensure the estate will continue to meet the needs of its staff and students.

In 2005-06 there was a programme of teaching room refurbishment combined with the new building programme. Resulting from organisational change, 2009-10 saw a significant programme of refurbishment carried out, and the university will be reporting an increase from 53 per cent to 92 per cent of its non-residential buildings in categories A and B, shown in the graph below:



The works carried out have also impacted the functionality of the buildings and a centralised timetabling policy has allowed the poorest teaching stock to be transferred for other uses. Also, the university is taking the opportunity to introduce the idea of 'combi offices' for academic staff where appropriate, rather than the traditional cellular space requested with the current restructuring of the academic departments. Although functionality is subjective, the university regularly carries out surveys of staff and students to assess the estate. In 2009-10, 97 per cent of the non-residential buildings were considered to be in functionality grades 1 and 2. Functionality has improved from the 84 per cent reported in the 2008-9 EMS return and up from 62 per cent in 2003-04. This can be seen in the graph below.



Technical notes and guide for interpretation and replication of results

99. EMS data are published annually to HEIs in the form of an interactive reporting database written in Excel and Visual Basic. Each version of the reporting database presents the most up-to-date snapshot of EMS data available at that time.

100. However, from time to time institutions amend their data after the reporting database has been issued and for this reason IPD maintains a separate database of EMS data that contains the most up-to-date version of the EMS data set. From this database IPD produces a 'working copy' of the reporting database which is used to produce the annual report. The annual report therefore relies on the most up-to-date version of the EMS data set, which may vary slightly from the version available to institutions.

101. This report presents EMS data over 10 years. Notwithstanding the comments above, in order to replicate the results in this report, institutions should refer the following versions of the EMS reporting database:

- 2004-09 – EMS institution report 2010
- 2003-04 – EMS institution report 2009
- 2002-03 – EMS institution report 2008
- 2001-02 – EMS institution report 2006
- 2000-01 – EMS institution report 2005
- 1999-2000 – EMS institution report 2004.

102. A percentile distribution is displayed for all institutions that provided data for each year. This means that the institution sample for each year is unlikely to be exactly the same for the following reasons:

- mergers
- new entries to the sector
- institutions either not participating in EMS or failing to provide full data.

103. Notwithstanding these factors, IPD regards the sample sizes for each measure for each year to be sufficiently large and robust to facilitate meaningful and representative analysis.

104. The standard chart format divides the distribution of results into four quadrants:

- the 10th to the 25th percentile (lower quartile)
- the 25th to the 50th percentile (median)
- the 51st to the 75th percentile (upper quartile)
- the 75th to the 90th percentile.

105. The top and bottom 10 percentiles have been excluded from the results in order to remove outliers and rogue results from the distribution, but have been included in the median and quartile calculations.

Annex A

1. The data in this annex are taken directly from the 2010 EMS institution report. The results may vary slightly from the version currently in circulation for the reasons outlined in paragraphs 99 to 105. There may also be some minor variances between the figures included in this section of the report and its main body as the following institutions are excluded from the All Institutions and English Institutions peer groups within the EMS reporting tool:

- Open University
- The Institute of Cancer Research
- University of London.

2. These institutions have been included in the analysis presented in the main body of this report.

Table 2 Institutional sustainability by country

HEI Income (D1) psm NIA (D12) C1	2004-05	2005-06	2006-07	2007-08	2008-09	Change 2004-05 to 2008-09
UK	£882	£936	£1,045	£1,130	£1,195	35.6%
England	£911	£960	£1,061	£1,164	£1,243	36.4%
Scotland	£777	£831	£926	£1,017	£1,008	29.7%
Wales	£737	£786	£989	£1,092	£1,100	49.2%
Ratio of Total property costs (D26) to HEI Income (D1) C1	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	9.7%	9.8%	9.7%	9.4%	9.4%	-3.2%
England	9.4%	9.8%	9.7%	9.3%	9.2%	-1.9%
Scotland	10.9%	10.0%	10.7%	10.1%	10.6%	-3.3%
Wales	8.9%	9.8%	9.2%	9.7%	10.1%	13.5%
Total property costs (D26) per student FTE (D4) C1	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	£935	£928	£1,026	£1,091	£1,180	26.2%
England	£849	£900	£988	£1,008	£1,134	33.5%
Scotland	£1,176	£1,345	£1,447	£1,447	£1,506	28.0%
Wales	£963	£929	£1,138	£1,254	£1,261	30.8%
Non residential backlog affordability score	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	6.1	5.8	6.8	7.0	8.9	47.1%
England	6.5	6.3	6.9	7.6	9.3	43.4%
Scotland	2.9	2.9	4.0	4.1	5.9	106.6%
Wales	7.9	8.0	7.5	6.1	6.2	-22.5%
Cost to upgrade condition C+D to B as % of IRV C13	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	8.5%	8.7%	7.5%	6.3%	5.6%	-34.5%
England	8.0%	8.4%	7.4%	6.4%	5.4%	-32.5%
Scotland	16.1%	14.0%	10.8%	11.4%	9.4%	-41.6%
Wales	6.4%	5.0%	5.8%	5.2%	5.5%	-14.3%
Insurance replacement value (D24) to HEI income (D1) C1	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	2.3	2.4	2.4	2.4	2.3	1.6%
England	2.3	2.4	2.3	2.3	2.3	0.4%
Scotland	2.6	2.6	2.8	3.2	2.6	1.7%
Wales	2.6	2.5	2.5	2.7	2.3	-13.4%
Ratio of Maintenance costs (D33) and Capex (D25) to IRV D24 C13	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	5.1%	5.1%	5.5%	4.8%	4.7%	-8.7%
England	5.8%	5.6%	5.8%	5.2%	5.0%	-14.0%
Scotland	4.8%	3.8%	4.2%	4.8%	4.0%	-17.5%
Wales	3.3%	4.2%	4.5%	3.4%	3.7%	11.6%

Table 3 Space efficiency by country

Total non-residential NIA (D12) per student FTE (D4)	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	8.0 m²	7.9 m²	7.6 m²	7.7 m²	7.4 m²	-6.6%
England	7.5 m²	7.2 m²	6.9 m²	7.3 m²	7.0 m²	-6.6%
Scotland	11.7 m²	12.5 m²	12.2 m²	11.5 m²	10.1 m²	-13.7%
Wales	8.8 m²	8.8 m²	8.0 m²	7.9 m²	8.2 m²	-7.1%
Academic office NIA (D12) per academic staff FTE (D5)	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	13.8 m²	13.9 m²	13.6 m²	13.9 m²	13.9 m²	0.6%
England	13.6 m²	13.6 m²	13.6 m²	13.6 m²	13.2 m²	-3.0%
Scotland	14.2 m²	14.5 m²	13.6 m²	13.8 m²	14.5 m²	2.1%
Wales	13.9 m²	14.1 m²	15.6 m²	15.9 m²	15.7 m²	13.0%
Support office NIA (D12) per support office staff FTE (D5)	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	13.3 m²	13.1 m²	13.7 m²	13.1 m²	12.9 m²	-3.4%
England	13.5 m²	12.7 m²	13.6 m²	13.0 m²	12.8 m²	-5.7%
Scotland	12.8 m²	13.5 m²	16.7 m²	12.4 m²	14.1 m²	10.5%
Wales	10.8 m²	12.6 m²	12.8 m²	12.8 m²	13.5 m²	25.3%

Table 4 Condition and functional suitability by country

Building condition % GIA Condition A and B C13	2004-05	2005-06	2006-07	2007-08	2008-09	Change 2004-05 to 2008-09
UK	66.0%	71.0%	71.0%	73.0%	76.0%	15.2%
England	69.5%	73.0%	75.3%	74.5%	77.0%	10.8%
Scotland	51.9%	46.0%	52.0%	61.0%	62.0%	19.6%
Wales	74.0%	68.0%	68.5%	69.5%	62.0%	-16.2%
Functional suitability % GIA Grade 1 and 2 C13	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	76.0%	76.0%	78.0%	79.0%	83.0%	9.2%
England	76.0%	76.0%	78.0%	79.0%	83.0%	9.2%
Scotland	75.0%	68.8%	68.5%	83.5%	83.0%	10.7%
Wales	69.5%	73.5%	77.5%	78.0%	78.0%	12.2%

Table 5 Environmental performance by country

Energy consumption kW/h (D38A) per student FTE (D4) C13	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	2,799 kWh	2,783 kWh	2,608 kWh	2,796 kWh	2,794 kWh	-0.2%
England	2,539 kWh	2,682 kWh	2,314 kWh	2,505 kWh	2,505 kWh	-1.3%
Scotland	5,170 kWh	5,748 kWh	4,967 kWh	4,985 kWh	5,440 kWh	5.2%
Wales	2,593 kWh	2,414 kWh	2,727 kWh	3,087 kWh	3,177 kWh	22.5%
Waste mass (tonnes) per student FTE	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	0.121 t	0.145 t	0.127 t	0.116 t	0.136 t	12.1%
England	0.129 t	0.159 t	0.142 t	0.125 t	0.142 t	10.1%
Scotland	0.141 t	0.111 t	0.093 t	0.111 t	0.103 t	-27.3%
Wales	0.105 t	0.126 t	0.079 t	0.097 t	0.089 t	-15.0%
Water consumption m³ (D38B) per student FTE (D4) C13	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	7.6 m³	7.8 m³	7.5 m³	7.5 m³	6.8 m³	-10.8%
England	7.3 m³	7.4 m³	7.1 m³	7.1 m³	6.1 m³	-16.7%
Scotland	13.3 m³	15.5 m³	16.8 m³	14.0 m³	15.3 m³	15.5%
Wales	6.7 m³	6.9 m³	6.0 m³	5.7 m³	7.1 m³	6.2%
Recycled waste proportion (C1)	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	12.7%	14.0%	22.9%	29.7%	34.2%	168.7%
England	12.6%	14.0%	25.5%	29.8%	35.4%	181.0%
Scotland	13.7%	14.6%	14.6%	24.3%	25.7%	87.6%
Wales	14.4%	15.0%	25.7%	31.6%	34.8%	141.0%
Notional energy emissions (kg CO2) per student FTE (D4) C1	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	1,010kg	984kg	917kg	967kg	1,230kg	21.8%
England	979kg	917kg	864kg	906kg	1,067kg	9.0%
Scotland	1,658kg	1,658kg	1,474kg	1,537kg	1,938kg	16.9%
Wales	939kg	1,120kg	1,003kg	1,114kg	1,435kg	52.9%

Important note: the time series presented above for notional energy emissions does not provide an accurate time series due to methodological changes in how the figures are calculated.

Table 6 Residential ratios by country

HEI Income (D1) per bedspace (D23) C14	2004-05	2005-06	2006-07	2007-08	2008-09	Change 2004-05 to 2008-09
UK	£2,655	£2,788	£2,974	£3,297	£3,393	27.8%
England	£2,674	£2,824	£2,989	£3,353	£3,446	28.8%
Scotland	£2,628	£2,929	£3,074	£3,448	£3,367	28.1%
Wales	£2,253	£2,326	£2,492	£2,716	£3,011	33.6%
Total property costs (D26) per bedspace (D23) C14	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Change 2004-05 to 2008-09**
UK	£937	£1,018	£1,123	£1,198	£1,313	40.0%
England	£979	£1,056	£1,170	£1,259	£1,338	36.6%
Scotland	£700	£778	£944	£902	£1,056	50.8%
Wales	£743	£921	£1,012	£1,097	£1,411	89.8%

Table 7: Summary statistics

Estimated totals in UK HE estates, 2003-04 to 2008-09

Year	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Number of HEIs	**163**	**161**	**161**	**161**	**158**	**160**
Estate size						
1. Total gross internal area of the UK HE estate (million m²)	24.9	25.2	25.4	25.6	25.9	25.9
2. Total net internal area of the UK HE estate (million m²)	18.4	18.6	18.8	19.2	19.0[16]	18.9
3. Total net internal area: teaching space (million m²)	5.6	5.5	5.3	5.4	5.5	5.4
4. Total net internal area: research space (million m²)	2.7	2.8	3.0	2.9	3.0	3.0
5. Total net internal area: support space (million m²)	3.6	3.9	3.8	3.9	4.1	4.1
6. Total net internal area: residential space (million m²)	4.9	4.9	4.9	4.7	4.8	4.7
7. IRV of total estate (£ billion)	38.9	43.3	48.1	52.2	57.4	60.6
Total costs						
8. Total (revenue) property costs (£ billion)	1.55	1.67	1.87	2.0	2.1	2.3
9. Maintenance expenditure (£ million)	507	533	588	636	692	736
10. Capital expenditure (£ billion)	1.7	1.9	1.9	2.2	2.3	2.4

[16] The decline in NIA appears to have been caused by comprehensive re-measurement undertaken by a number of HEIs. The divergence from the upward trend in GIA is surprising and discussions have been held with a number of institutions regarding interpretation of the NIA definition.

Age and condition						
11. Proportion of non-residential space constructed pre-1940	25%	24%	24%	24%	23%	23%
12. Amount of non-residential and residential space in categories C and D (million m^2)	8.4	8.7	8.6	8.6	7.8	7.3
13. Total backlog cost of maintenance (including residences) (£ billion)	3.9	4.3	3.8	3.9	5.1	5.0
Energy and water consumption						
14. Energy consumption total (million kWh)	7,742	7,771	7,752	7,256	7,600	7,673
15. Water consumption (million m^3)	25.6	31.1	26.0	25.4	26.0	25.6
16. Estimated CO_2 emissions (million tonnes)	1.9	2.0	2.0	1.8	2.1	2.6
Business indicators						
17. Total income (£ billion)	16.1	17.3	19.4	21.1	23.3	25.2
18. Student FTEs (millions)	1.47	1.49	1.56	1.57	1.59	1.55

Table 8: Assumptions used to produce data in Table 7

Row number in Table 7	Comment
All	All figures contain an element of estimate due to variable response rates and the changing shape of the sector. Efforts have been made to reduce the effects of this.
1	For HEIs unable to provide a GIA for the entire estate, a total has been estimated by grossing up the net area. Where data are missing, an estimate has been based on previous data returns. Where no figure is available for the residential estate, no total GIA is available.
2	For institutions unable to provide a total NIA for the entire estate, the area has been estimated by scaling down the gross area. Where data were missing, an estimate has been based on the 2008 data return. Where no figure is available for the residential estate, no total NIA is available. A number of institutions are unable to provide an NIA for residences, thus precluding presentation of total NIA.
3 to 5	The actual area of categories of space at institutions unable to make returns has been estimated by assuming those HEIs have an average proportion of space types. Support space includes learning resource centres, libraries and open-access computer space available for general use.
6	For institutions unable to provide a total net internal residential area for the entire estate, the area has been estimated by scaling down the gross residential area. Where the number of bed spaces has been provided by HEIs, the net residential space has been estimated by application of the average space per bed space.
7	In previous years the IRV per m² gross space has been used to estimate an IRV for institutions where no data were available.
8	Total property cost includes rateable value (as a proxy for rental value), rates, service charge, insurance premiums, energy, water and sewerage, maintenance (revenue only), cleaning, and internal and external estate management costs. No capital expenditure is included in this figure. Where HEIs were unable to return a total property cost in accordance with EMS, an estimate was made by adopting the mean cost per m² in respective countries.
9	Where HEIs were unable to return a total maintenance cost in accordance with EMS, an estimate was made by adopting the mean cost per m² in respective countries. Total maintenance cost relates to revenue costs only and is a subset of total property cost.
10	Capital expenditure totals have been calculated from annual returns to the Higher Education Statistics Agency (HESA). Historical figures will differ from previous reports due to the use of HESA data in place of the HEI return.
11	The mean proportions of pre-1940 space returned by HEIs.

12	For HEIs unable to classify the proportion of space in poor condition (categories C and D), a mean average proportion of total net area was assumed to be in those categories.
13	For HEIs unable to estimate the cost of upgrading 'poor' space, respective average costs per m^2 to upgrade have been applied to total gross space data at institutional level. Historical figures will differ from previous reports due to a different method of calculation.
14	For HEIs unable to provide total estate energy consumption data, an estimate has been made using the student FTE population and the median reported consumption per student FTE in each year.
15	For HEIs unable to provide water consumption volumes, an estimate has been based on student FTE population and the median reported consumption per student FTE in each year.
16	In many instances, CO_2 emissions provided by HEIs have used specific local CO_2 conversion factors depending on the specific energy sources and processes. Where no specific conversion data were accessible, an estimate of CO_2 emissions has been made using standard conversions of consumption data.
17	Income figures, as supplied by HESA, for all HEIs that made an EMS return in each year. There may therefore be some small discontinuities in the time series.
18	Total student FTEs, as supplied by HESA, for all HEIs that have made an EMS return in each year. There may therefore be some small discontinuities in the time series.

Glossary and abbreviations

Academic space/staff	Space used for teaching and research and for its support (faculty offices, for example). Also all staff who tend to work in such areas.
Backlog affordability	The ratio of HEI income to the size of the repair backlog. The higher the number, the more affordable is the repair backlog.
CRC	Carbon Reduction Commitment
DEL	Department of Education and Learning (Northern Ireland)
EMS	Estate Management Statistics
FTE	Full-time equivalent
Functional suitability	EMS measures the ability of space to support its existing function taking into account factors such as environment, layout, location and flexibility. The top grade (1) is described as excellent and the lowest (4) as poor.
GIA	Gross internal area
Good/poor condition	EMS classifies all space in four categories (A to D). For EMS purposes, the top two categories (A and B) are described as being in good condition and the bottom two (C and D) in poor condition.
HE	Higher education
HEFCE	Higher Education Funding Council for England
HEFCW	Higher Education Funding Council for Wales
HEI	Higher education institution
HESA	Higher Education Statistics Agency
Income per m²	The total income of the HEI divided by the total floor space (based on NIA).
IRV	Insurance Replacement Value
KPI	Key performance indicator
m²	Square metres
m³	Cubic metres
Net internal area (NIA)	A measure of the total amount of space within the external walls, excluding major circulation space and other major elements.
Occupancy rate (teaching)	The overall percentage rate at which teaching space is occupied, reflecting the average proportion of space utilised and the average proportion of teaching workspace capacity used.

Property cost to income ratio	The ratio between total property costs and HEI income.
Repair backlog	The cost of remedying all sub-standard property and ensuring the estate complies with legislation, as measured by the HEI.
RPI	Retail Price Index
SFC	Scottish Funding Council
Student FTE	Student full-time equivalent
Support space/staff	Support space comprises most of the non-teaching and research space in the HEI apart from the residential space and any space devoted to commercial activities. Also all staff who tend to work in such areas.
Teaching/research income per m²	The total teaching and research income of the HEI divided by the total floor space (based on NIA) allocated to teaching and research respectively. Because support space that does not generate income is excluded from these numbers, the teaching and research income per m² is almost always higher than the overall income described above.
Total property costs	Total property cost includes rateable value (as a proxy for rental value), rates, service charge, insurance premiums, energy, water and sewerage, maintenance, cleaning, and internal and external estate management costs. No capital expenditure is included in this figure.